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Enviro Control, Inc, Fort Collins, CO

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Fish and Wildlife Service, Western Energy and Land Use Team

May 78

Biological Services Program

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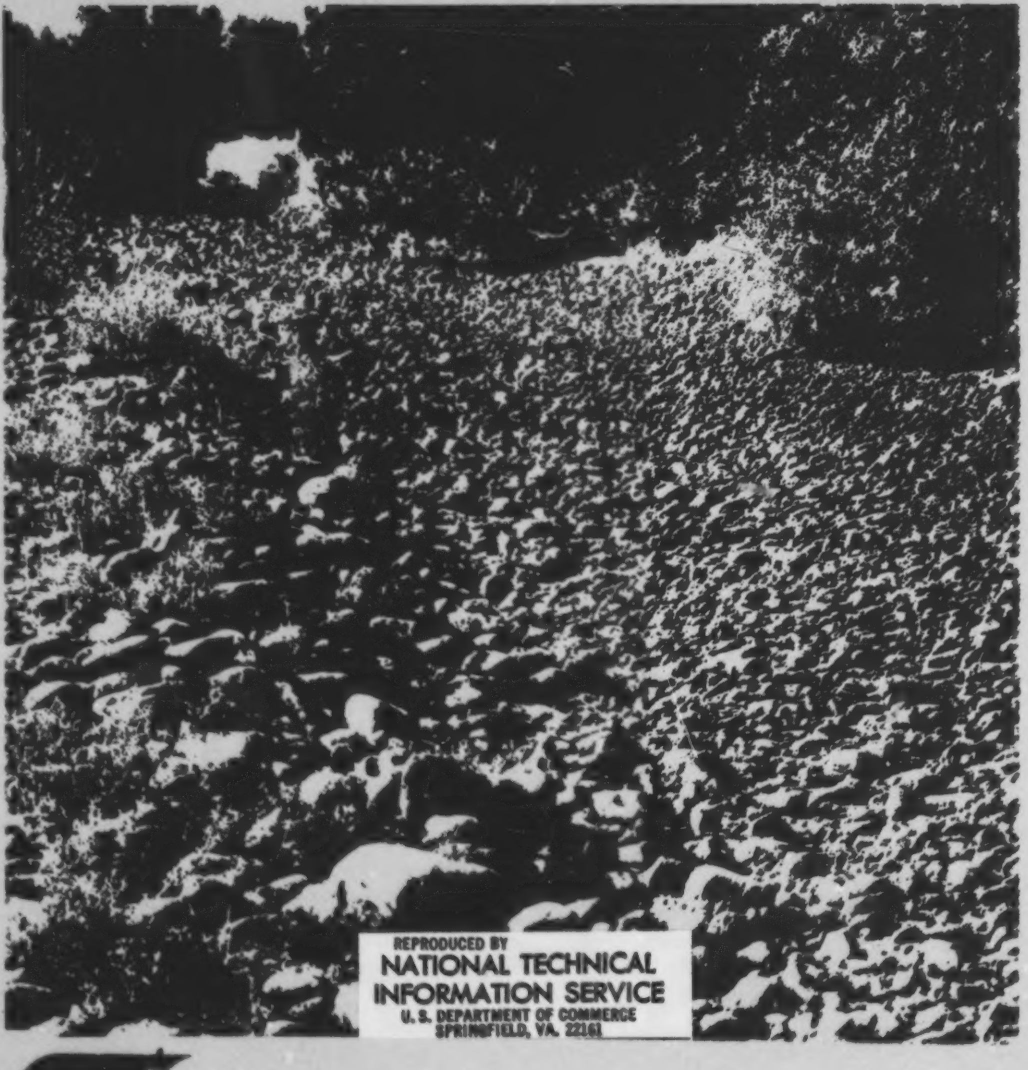
INSTREAM FLOW STRATEGIES FOR OREGON



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This is one of 13 reports that identifies and evaluates the most promising institutional methods for reserving instream flows to benefit fish and wildlife in each of 13 western states. The states included in the study are Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington and Wyoming. Each report has three main sections. First is a guide to help the reader select the most important strategy for any given situation, followed by a summary evaluation of how well the method has worked in the state. The third part is a detailed narrative description of the procedures for implementing the strategy and an example of how it has been employed in the state.

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INSTREAM FLOW STRATEGIES FOR OREGON

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U.S. DEPARTMENT OF THE INTERIOR

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PREFACE

This report represents the combined efforts of several individuals and firms toward a common objective: the identification, description and preliminary evaluation of the most promising strategies (institutional methods) for reserving instream flows for fish and wildlife under existing laws.

Toward this objective, the U.S. Fish and Wildlife Service, through its Western Water Allocation Project, contracted with two firms. Richard Dewsnup and Dallin Jensen received a contract to identify available strategies under state laws, federal laws, interstate compacts, and water quality laws. From a large number of strategies identified by this contract effort, the most promising ones were selected for further evaluation. A second firm, Enviro Control, Inc., was contracted to evaluate the most promising strategies in depth.

The combined efforts of the two firms were published in several reports which are identified below. Following this initial effort, a separate report for each state was published. This was done in the belief that most persons who are involved in instream flow work are primarily oriented to a single state. The several western states are at different levels in terms of their laws supporting instream flows, their water rights traditions, and their past experiences regarding the reservation of instream flows for fish and wildlife. This is one of the individual state reports.

The report is organized into three sections. These are the information matrix, the evalation matrix, and the narrative description of each strategy. The information matrix is intended to be a guide to help the reader select the strategy or stategies most applicable to any particular situation. This matrix contains a general description of the strategy, the most applicable situations for its use, the party or parties who can initiate the strategy, and the party or parties who must implement the strategy.

The evaluation matrix provides a subjective analysis of whether each strategy has been used to advantage, disadvantage, or not at all in each state. A unique feature of the evaluation matrix is that a blank matrix is provided for the reader. This is done because an evaluation of this kind is necessarily a product of a given time frame and a particular point of view. The blank evaluation matrix will allow the reader to evaluate the strategies as times, laws, experiences, and traditions change in the state.

The narrative section of the report contains an expanded description of each strategy, notes its application possibilities, illustrates the usage of the strategy within the state, and evaluates its general utility. All of the narrative materials are oriented to the particular state for which the report is written.

In the use of this report, the reader should be aware of its purposes and limitations. First, only a few of the many possible strategies are described herein. The user should exercise initiative, judgement, and creativity in dealing with any specific situation. Second, this report should be used as a starting point. In any situation related to the acquisition of instream water rights, legal advice should be sought. This report should in no way be construed as a substitute for the opinion of a private attorney, attorney general, or agency solicitor. Third, this report is neither a policy nor decision document. It is simply a collection of strategies which appear to have utility in a variety of situations.

Further questions about these and other strategies may be addressed to the Cooperative Instream Flow Service Group, U.S. Fish and Wildlife Service, Western Energy and Land Use Team, Drake Creekside Building, 2625 Redwing Road, Fort Collins, Colorado 80526. This Group is an interagency, intergovernmental, interdisciplinary service organization under sponsorship of the U.S. Fish and Wildlife Service, Western Energy and Land Use Team. The Group provides a focal point for the increasing activity of instream flow assessments.

For more detail on the strategies, the user of this report should be aware of supportive documentation contained in several related reports:

1. FWS/OBS-77/26. Strategies for Reserving Flows for Fish and Wildlife: Identifcation, Description and Preliminary Evaluation. By Richard L. Dewsnup and Dallin W. Jensen, February 1977. 706 pages.

   This is the full completion report prepared by Dewsnup and Jensen under the FWS contract. It contains chapters on regulatory authority and property rights in water resources, strategies for reserving instream flows under Federal statutes, strategies for protecting instream flows under State statutes, and interstate compacts as they relate to the protection of instream flows. This report is only available from the National Technical Information Service (NTIS Accession No. PB 276 243).

2. FWS/OBS-77/27. State Laws and Instream Flows. By Richard L. Dewsnup and Dallin W. Jensen, March 1977. 76 pages.

   This report is a slightly modified version of the State law chapter taken from the above report. It contains a summary matrix in which the legal basis (e.g., statute in the State code) for each strategy in each State will be identified. This report is also available from the National Technical Information Service (NTIS Accession No. PB 272974).

3. FWS/OBS-77/29. Promising Strategies for Reserving Instream Flows. By Richard L. Dewsnup and Dallin W. Jensen, Edward Hoban, Gerald Horak, Martin Lewis, and Wayne Nelson, August 1977. 63 pages.

This report contains descriptions of 26 strategies for reserving instream flows under existing laws. The descriptions provide guidance on the level of action required, legal bases for each strategy, and advantages, disadvantages, and costs involved in strategy implementation. This report is also available from the National Technical Information Service (NTIS Accession No. PB 276 046).

LIST OF ABBREVIATIONS

BLM	Bureau of Land Management
BR	Bureau of Reclamation
CE	Corps of Engineers
DOE	Department of Energy
FERC	Federal Energy Regulatory Commission
FWS	Fish and Wildlife Service
FS	Forest Service
HCRS	Heritage Conservation and Recreation Service
SCS	Soil Conservation Service

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INFORMATION MATRIX

INFORMATION MATRIX

Strategies for Reserving Instream Flows in Oregon

Title	IDENTIFICATION		APPLICATION				
			Initiation		Implementation		
	General Description	Applicable Situations	Parties	Actions	Parties	Actions	Expenditures
APPROPRIATIVE WATER RIGHTS							
State Condemnation and Reallocation of Water Rights	Not applicable in this State	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
State Appropriation of Instream Flows	Obtaining an administrative appropriation of streamflow from the State water rights agency for fish and wildlife purposes	Primarily along streams not fully appropriated; Secondarily along over-appropriated streams	Oregon Department of Fish and Wildlife; public interest groups; FWS Area Office (Portland)	Determine quantity of flow required; petition the Oregon Water Policy Review Board to set a minimum streamflow	Oregon Water Policy Review Board	Designate a minimum streamflow	Administrative cost
State Moratoria on New Appropriations	Obtaining a moratorium on granting of further appropriations from the State Water Rights Board and permit authority for the consideration of fish and wildlife needs.	In a rapidly developing river basin	Oregon Department of Fish and Wildlife; another State or local government agency; private individual; public interest group	Identify river where development is rapidly occurring; petition Oregon Water Policy Review Board and Oregon Department of Water Resources to declare a moratorium	Oregon Water Policy Review Board; Oregon Department of Water Resources; Oregon Department of Fish and Wildlife	Grant moratorium; study the river basin and make flow recommendations to be incorporated in basin plans	Bargaining cost; administration cost; study cost

INFORMATION MATRIX

Strategies for Reserving Instream Flows in Oregon

Title	IDENTIFICATION		APPLICATION				
	General Description	Applicable Situations	Initiation		Implementation		
			Parties	Actions	Parties	Actions	Expenditures
State Discretionary Water Permit Authority	Utilizing discretionary opportunities by the permit authority for the benefit of instream flows	Granting new water permits or exchanges or transfers of existing rights	Public interest groups; Oregon Department of Fish and Wildlife	Petition the Director of the Oregon Department of Water Resources to deny or amend permit application	Director of Oregon Department of Water Resources	Deny or amend permit application	Bargaining cost; study cost
LEGISLATIVE AND ADMINISTRATIVE CONTROLS							
Federal Reauthorization of Projects	Reauthorizing existing Federal water resource projects to provide for instream flow reservation	At existing Federal dams or stream diversions	Construction agency; public interest groups; FWS Area Office (Portland); Oregon Department of Fish and Wildlife	Lobby to have construction agency conduct feasibility study; seek Congressional reauthorization	U.S. Congress	Enact legislation reauthorizing the project (approved by Committee, passed by both houses)	Feasibility study cost; bargaining cost; legislative cost
State-Federal Wild and Scenic Rivers System	Designating stream segments for inclusion within a wild and scenic rivers system to promote instream flow reservations	Along free-flowing stream segments, bordered by visually appealing landscape	Local citizens; Member of Congress	Organize and demonstrate local support to convince elected representatives to introduce a Bill	U.S. Congress; Forest Service; Heritage Conservation and Recreation Service; FWS Region 1 Office; Oregon Department of Fish and Wildlife	Pass a Bill authorizing study of the river; conduct study to inventory resource and solicit local views after agency review, consider study report in Congressional Committee and pass a Bill approving designation	Study cost; legislative cost

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Strategies for Reserving Instream Flows in Oregon

	IDENTIFICATION		APPLICATION				
			Initiation		Implementation		
Title	General Description	Applicable Situations	Parties	Actions	Parties	Actions	Expenditures
State Definition of Navigable Waters	Utilizing the definition of navigable waters to preserve instream flows	Along navigable streams	Oregon Department of Fish and Wildlife; another State resource agency	Determine that the stream meets the definition of navigability	Oregon Department of Fish and Wildlife; another State resource agency	Select the best course of action to reserve an instream flow through other State strategies	Study cost; legal costs
State-Federal Interagency Consultation	Adopting interagency agreements, regulations, and formal procedures to implement the Fish and Wildlife Coordination Act toward promoting instream flow reservations	Planning new or expanded Federal water resource projects	FWS Region 1 Office; Oregon Department of Fish and Wildlife; public interest groups	Seek interagency agreements based on adopted regulations or procedures; promote strengthening procedures or see that they are enforced	FWS Region 1 Office; Oregon Department of Fish and Wildlife; construction or permit agency	Draw up agreements or make existing procedures more stringent	Bargaining cost
Federal License and Permit Stipulations	Incorporating stipulations in new and renewed Federal licenses and permits to reserve instream flows	Authorizing planned or existing Federal dams and reservoir projects	FWS Area Office (Portland); Oregon Department of Fish and Wildlife; public interest groups; private citizens	Determine quantity of flow required; make specific instream flow recommendation to permit or license agency	Permit or license agency (FERC, BLM, FS etc.)	Stipulate flow reservation in permit or license	Study cost; bargaining cost
State Allocation of Reservoir Space	Not applicable in this State	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

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Strategies for Reserving Instream Flows in Oregon

Title	IDENTIFICATION		APPLICATION				
			Initiation		Implementation		
	General Description	Applicable Situations	Parties	Actions	Parties	Actions	Expenditures
State Purchase and Lease of Water Rights	Obtaining contractual arrangements which include direct purchase of flow rights, the leasing of water rights, and the purchase of shares in a mutual water company to enhance instream flows	Particularly along overappropriated streams	Oregon Department of Fish and Wildlife; private citizens; public interest groups	Identify stream where the purchase of only a few cfs can make a significant difference to the fishery; locate willing seller, lessor, or mutual shares company	Oregon Department of Fish and Wildlife; private citizens; public interest groups	Purchase or lease water right or purchase shares in a mutual shares company	Acquisition cost; negotiation cost
WATER RESOURCE PLANNING							
Federal Water Resources Council Planning Program	Considering instream flow needs in Water Resources Council planning programs toward promoting flow reservations	Planning river basin and energy development	Oregon Department of Fish and Wildlife; FWS Cooperative Instream Flow Group; FWS Region 1 Office; public interest groups	Lobby to have instream flows considered in Level B study Section 13(a) assessment	Pacific Northwest River Basins Commission	Include instream flow requirements in Level B Section 13(a) assessment	Study cost
Federal Aid Funding to Purchase Storage	Expending Federal Aid funding to purchase reservoir storage as a means of reserving instream flows	Along overappropriated streams at privately owned reservoirs	Oregon Department of Fish and Wildlife	Identify stream and reservoir; file required documents requesting funds from Region 1 Federal Aid Office	FWS Region 1 Federal Aid Office; Oregon Department of Fish and Wildlife	Grant funds; purchase the water rights	Administrative cost; acquisition cost

INFORMATION MATRIX

Strategies for Reserving Instream Flows in Oregon

Title	IDENTIFICATION		APPLICATION				
			Initiation		Implementation		
	General Description	Applicable Situations	Parties	Actions	Parties	Actions	Expenditures
Federal Reservoir Construction and Enlargement	Constructing larger new reservoirs or enlarging existing reservoirs to provide for instream flow reservations	At existing or planned Federal reservoirs	FWS Area Office (Portland); Oregon Department of Fish and Wildlife; public interest groups	Conduct stream investigation; recommend a larger dam and reservoir; allocate additional costs to fish and wildlife benefits	Construction agency; U.S. Congress	After possible Congressional authorization, constructs additional storage for instream flows	Study costs; bargaining cost; construction cost legislative cost
WATER RESOURCE MANAGEMENT							
State Water Rights Records Analyzed	Analyzing water rights records as an aid to reserving flows	Bargaining for an instream flow	Oregon Department of Fish and Wildlife; FWS Area Office (Portland); public interest groups	Determine the extent, location and ownership of water rights from the Oregon Department of Water Resources	Oregon Department of Fish and Wildlife; FWS Area Office (Portland); public interest group	Select the best course of action to reserve an instream flow	Water data cost; study cost
State-Federal Flow Requests Made Early	Presenting recommendations early in the decision process to achieve reservation of instream flows	At planned Federal dams and reservoirs	FWS Area Office (Portland); Oregon Department of Fish and Wildlife; public interest groups	Conduct a timely investigation; recommend an instream flow to the construction agency	Construction agency	Include instream flow in project plans	Study cost; gaging installation and maintenance cost; bargaining cost

INFORMATION MATRIX

Strategies for Reserving Instream Flows in Oregon

Title	IDENTIFICATION		APPLICATION				
			Initiation		Implementation		
	General Description	Applicable Situations	Parties	Actions	Parties	Actions	Expenditures
State-Federal Flow Requests Made Specific	Specifying and monitoring instream flow reservations to protect downstream fish and wildlife resources	Along stream reaches below existing or planned Federal dams and reservoirs	FWS Area Office (Portland); Oregon Department of Fish and Wildlife; public interest groups	Conduct detailed instream flow study; recommend flow to the construction and/or permit agency, specifying flow releases and flow quantities required at downstream sites	Construction agency/permit agency	Include flow releases in reservoir's operating criteria; install gaging stations to determine the sufficiency of the actual releases	Study cost; gaging, installation and maintenance cost; bargaining cost
State-Federal Combined Storage and Flow Requests	Negotiating for reservoir storage to facilitate instream flow reservations	Planning new reservoirs or reallocating storage space in existing Federal reservoirs	FWS Area Office (Portland); Oregon Department of Fish and Wildlife; public interest groups	Request information regarding reservoir storage allocations and projected sales from the construction agency; determine the amount of storage available to ensure minimum instream flows; recommend storage and flow requirements	Construction agency	Allocate storage to fish and wildlife; include flow releases in the reservoir operating criteria	Bargaining cost; study cost

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Title	IDENTIFICATION		APPLICATION				
			Initiation		Implementation		
	General Description	Applicable Situations	Parties	Actions	Parties	Actions	Expenditures
ENGINEERING ALTERNATIVES							
Coordinated Multi-Reservoir Operations	Coordinating operations of multi-reservoir systems to facilitate instream flow reservations	At Federal dams and reservoirs in multi-reservoir system	FWS Area Office (Portland); Oregon Department of Fish and Wildlife; FWS Region 1 Office	Conduct system-wide flow study to establish the flows required; propose to alter the operations manual and memorandum of agreement to ensure the recommended flows	Agency or agencies operating the system; U.S. Congress	After possible Congressional reauthorization or relicensing, revise the system operations manual to include stream flows	Study cost; bargaining cost; legislative cost
Reservoir Sediment Storage Releases	Releasing reservoir sediment storage reserves to promote instream flow reservations	At existing Federal dams and reservoirs	FWS Area Office (Portland); Oregon Department of Fish and Wildlife; public interest groups	Determine the quantity of available yield from the sediment reserve; recommend that the construction or administering agency reassign a portion of this yield to benefit fish and wildlife resources	Construction or administering agency	Modify project operation; release yield from the sediment reserve for instream flows	Study cost; bargaining cost

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Title	IDENTIFICATION		APPLICATION				
			Initiation		Implementation		
	General Description	Applicable Situations	Parties	Actions	Parties	Actions	Expenditures
Stream Channels to Convey Stored Water	Conveying stored water to downstream users via the stream channel to aid in securing instream flow reservations	At planned Federal dams and reservoirs	FWS Area Office (Portland); Oregon Department of Fish and Wildlife; public interest groups	Obtain information regarding proposed conveyance systems; determine system's effect on fish and wildlife resources; recommend system modification to the construction agency	Construction agency	Modify conveyance system to preserve fish and wildlife resources	Study cost; re-design cost; bargaining cost

EVALUATION MATRIX

EVALUATION MATRIX Strategies for Reserving Instream Flows in Oregon

yes = Advantage ●
no = Disadvantage ○
blank - Inapplicable (in this State)

	ELEMENTS OF EFFECTIVENESS																					ELEMENTS OF COST					
	Overall		Political			Legal					Administrative						Resource					Institutional			Monetary		
	Demonstrated past utility in this State?	Optimism over future effectiveness in this State?	Predominantly involves fish & wildlife interests?	Can be implemented by fish and wildlife interests?	Attracts support from public interest groups?	Clearly established statutory basis?	Avoids legislative or judicial action?	Recognized without legal challenge?	Legally recognizes fish & wildlife values?	Creates legal right to flow reservation?	Available independent of other strategies?	Fits into a funded agency program?	Involves established administrative procedure?	Uses available fish & wildlife agency expertise?	Uses quantified instream flow needs?	Influences early planning & design decisions?	Directly results in flow reservation?	Results in storage for flow augmentation?	Useful during extended low flows?	Useful for overappropriated streams?	Useful with small streams?	Avoids costly legal process?	Avoids costly bargaining process?	Avoids costly planning & design?	Avoids costly reservoir development?	Avoids costly water rights acquisition?	Avoids costly forfeiture of water revenue?
Appropriative Water Rights																											
State Condemnation/Reallocation of Water Rights																											
State Appropriation of Instream Flow	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	○	●	○	○	●	●	●	●	●	●	●	●
State Moratoria on New Appropriations	●	●	○	○	●	○	○	●	○	○	○	●	●	●	●	●	○	○	○	○	●	●	○	○	●	●	○
State Discretionary Water Permit Authority	●	●	●	○	●	○	●	●	●	○	●	●	●	●	●	○	○	○	○	○	●	●	○	●	●	●	○
Legislative/Administrative Controls																											
Federal Reauthorization of Projects	●	○	●	○	●	●	○	●	●	●	●	○	○	●	●	○	●	●	●	●	○	○	○	○	●	●	○
State-Federal Wild & Scenic River Systems	●	●	○	○	●	●	○	●	●	●	●	●	●	●	○	○	●	○	●	○	●	○	○	○	●	●	●
State Definition of Navigable Waters	○	○	○	○	●	●	○	○	○	●	○	○	○	○	○	○	●	○	○	○	●	○	○	●	●	●	○
State-Federal Interagency Consultation	○	●	●	●	●	●	●	●	●	○	○	●	●	●	○	●	○	○	○	○	○	●	○	●	●	●	●
Federal License & Permit Stipulations	●	●	○	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	●	●	○
State Allocation of Reservoir Space																											
State Purchase & Lease of Water Rights	○	●	●	●	●	●	●	○	○	●	●	○	●	●	●	○	●	●	●	●	●	●	●	●	●	○	●
Water Resource Planning																											
Federal WRC Planning Programs	●	○	○	○	○	●	●	●	○	○	●	●	●	●	●	●	○	○	○	○	○	●	○	○	●	●	●
Federal Aid Funding to Purchase Storage	○	●	●	●	○	●	●	○	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	○	●
Federal Reservoir Construction/Enlargement	●	●	●	○	●	●	○	●	○	○	●	●	●	○	●	●	●	●	●	●	○	●	○	○	○	●	●
Water Resource Management																											
State Water Rights Records Analyzed	●	●	●	●	○	●	●	●	○	○	○	○	○	○	●	●	○	○	○	●	●	●	●	●	●	●	●
State-Federal Flow Requests Made Early	●	●	●	○	○	●	●	●	○	○	●	●	●	●	●	●	●	○	●	●	○	●	○	○	●	●	●
State-Federal Flow Requests Made Specific	●	●	●	○	○	●	●	●	○	○	●	●	●	●	●	●	●	○	●	●	●	●	○	○	●	●	●
State-Federal Combined Storage/Flow Requests	●	●	●	○	○	●	●	●	○	○	●	●	●	○	●	●	●	●	●	●	○	●	○	○	●	●	○
Engineering Alternatives																											
Coordinated Multireservoir Operations	●	●	●	○	●	○	●	●	○	○	●	○	○	○	●	○	●	○	●	●	○	●	○	○	●	●	○
Reservoir Sediment Storage Releases	○	○	●	○	●	○	○	●	○	○	●	○	○	○	●	○	○	●	●	●	○	●	○	●	●	●	○
Stream Channels to Convey Stored Water	○	●	●	○	○	○	●	●	○	○	○	○	○	○	●	●	●	○	●	●	●	●	○	○	●	●	●

Answers are strictly judgmental, based on written and verbal opinion reported to the Enviro Control study team through December 1977; subject to modification by selected reviewers (empty matrix furnished for reviewers on the following page).

EVALUATION MATRIX Strategies for Reserving Instream Flows in ____________

yes = Advantage ●
no = Disadvantage ○
blank - Inapplicable (in this State) ☐

	ELEMENTS OF EFFECTIVENESS																					ELEMENTS OF COST					
	Overall		Political			Legal					Administrative						Resource					Institutional			Monetary		
	Demonstrated past utility in this State?	Optimism over future effectiveness in this State?	Predominantly involves fish & wildlife interests?	Can be implemented by fish and wildlife interests?	Attracts support from public interest groups?	Clearly established statutory basis?	Avoids legislative or judicial action?	Recognized without legal challenge?	Legally recognizes fish & wildlife values?	Creates legal right to flow reservation?	Available independent of other strategies?	Fits into a funded agency program?	Involves established administrative procedure?	Uses available fish & wildlife agency expertise?	Uses quantified instream flow needs?	Influences early planning & design decisions?	Directly results in flow reservation?	Results in storage for flow augmentation?	Useful during extended low flows?	Useful for overappropriated streams?	Useful with small streams?	Avoids costly legal process?	Avoids costly bargaining process?	Avoids costly planning & design?	Avoids costly reservoir development?	Avoids costly water rights acquisition?	Avoids costly forfeiture of water revenue?
Appropriative Water Rights																											
State Condemnation/Reallocation of Water Rights																											
State Appropriation of Instream Flow																											
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State Allocation of Reservoir Space																											
State Purchase & Lease of Water Rights																											
Water Resource Planning																											
Federal WRC Planning Programs																											
Federal Aid Funding to Purchase Storage																											
Federal Reservoir Construction/Enlargement																											
Water Resource Management																											
State Water Rights Records Analyzed																											
State-Federal Flow Requests Made Early																											
State-Federal Flow Requests Made Specific																											
State-Federal Combined Storage/Flow Requests																											
Engineering Alternatives																											
Coordinated Multireservoir Operations																											
Reservoir Sediment Storage Releases																											
Stream Channels to Convey Stored Water																											

APPROPRIATIVE WATER RIGHTS

STATE CONDEMNATION AND REALLOCATION OF WATER RIGHTS

According to the Office of the Attorney General, the Oregon State Constitution would allow the condemnation of a water right by the State or by a political subdivision of the State, since a water right is a property right and all property rights are subject to the State's power of eminent domain. Whether the State's power of eminent domain extends to a State department, as, for example, the Department of Water Resources, depends upon the statutory powers of the Department in question. It is the opinion of the Department of Water Resources that, though this power is constitutionally available to the State, since there has been no special power or eminent domain designated to the Department by the Legislature it is not available to the Department. Another State department, the Department of Transportation, Parks and Recreation Division has such power and is considering exercising it in connection with reserving minimum instream flows for navigation on the John Day River. However, no water rights have been condemned to date.

Water rights are occasionally cancelled and reallocated by the Department of Water Resources under its five-year forfeiture rule. If a user is not using water according to the stipulations and conditions of his permit, the Department can revoke the permit. In this case, the water reverts to the public for further appropriation. It could thus be reallocated in the public interest and reserved under the instream flow law. (see strategies entitled State Appropriation of Instream Flow and State Discretionary Water Permit Authority).

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STATE APPROPRIATION OF INSTREAM FLOW

I. Identification

Oregon has been a leader in creating legal means to reserve instream flows since 1955, when the so-called "minimum stream flow" law (ORS 536, 300-310) was passed. This law classifies fish and wildlife uses as beneficial uses of water and establishes a "public water right" to minimum stream flows to be designated by a lay board, formerly the Water Policy Review Board, the State Water Resources Board. The state minimum flows are not, technically speaking, water rights, though as regards enforcement they have the same temporal priorities as water rights obtained by permit application. Because the minimum stream flow is created by administrative rule, it can be revised, suspended, or even withdrawn altogether by another administrative rule. There is some question as to whether it can be suspended by the courts.

II. Application

The parties involved in formulating and applying this strategy are the Water Policy Review Board, the Department of Water Resources, and the Department of Fish and Wildlife. Under the minimum stream flow law the Board has the power to issue general policy statements which directs the Water Resources Department to establish minimum flows for streams. The Board is a lay board, and relies on the State Water Resources Department to implement the Board's policies issue water rights permits, keep the water records, and enforce the permit system for all beneficial uses.

On any major policy decision the Board seeks local input. Local agencies, including State resource agencies, may contribute members to study committees. Ultimately a public hearing is held where anyone may voice objections to Board policy. When a resource agency such as the Oregon Department of Fish and Wildlife wants the Board to act on an issue such as setting a minimum streamflow for a given stream or basin, it submits its recommendations to the Board together with supporting studies. The Board then considers the recommendations and decides whether or not to designate a minimum stream flow. If the Board decides to act, it does so by passing an administrative rule. The minimum flow takes its place in the priority system as of the date of the rule; it is junior to all water rights filed prior to its establishment, but senior to those filed after it was established. The Department of Water Resources, by means of the local watermasters, enforces the minimum flows along with water rights established by permit.

Aside from the administrative procedure outlined above, there is no way to reserve a right to a natural instream flow under Oregon law. That, at least, is the present interpretation of the law as it is administered by the State Department of Water Resources, in both its policy-development and its permit-granting functions. No permits are issued for direct passage of natural flows to remain in the waterway, though water permits have been issued both to the State Fish and Wildlife Department and to others for water to be kept in the stream, where the situation involved either the release of stored water or another kind of diversion.

The main costs of this strategy are funding and staffing the studies necessary to make clear and specific recommendations to establish minimum flow needs. The Oregon Department of Fish and Wildlife has spent $600,000 over the last decade gathering and interpreting such data. About 400 minimum stream flows have been set under the statute; about 50 reservoir storage release permits have been issued for instream flow purposes. Appropriation of minimum stream flow is sometimes used in combination with purchase of stored water in reservoirs for release at low flow periods. In some cases this is the only way to assure enough water to maintain needed flow during the dry season.

III. Illustration

In 1958 the Oregon Water Resources Board established minimum instream flows at seven different points on six streams in the watershed of the Umpqua mission, now part of the Oregon Department of Fish and Wildlife, submitted recommendations, but since few field studies had been undertaken in the basin at that time they had little data on which to base them. The formula used to arrive at the minimum flows was the average of the three lowest flows of record. The Commission felt that the minimum flows established in 1958 were grossly inadequate. During the next fourteen years they studied the basin, developing new methodologies for analyzing data and refining their recommendations on the basis of their studies.

The Umpqua River Basin consists of four river systems which support both anadromous species and other game and non-game fish. The most important limiting factor in fish production is the low water supply from July through October. In the south Umpqua and lower Umpqua naturally low flows are further depleted by extensive water withdrawals, and water quality problems caused by domestic and industrial pollution, siltation, and inadequate amounts of dissolved oxygen as well as high summer water temperatures (over 70° F) excerbate the situation.

The Oregon State Game Commission completed its stream flow study of the Umpqua Basin in 1968. They studied spawning and rearing requirements of salmon and steelhead, as well as the water requirements of game resources. These minimum stream flow recommendations were detailed, covering approximately 130 check points and ranging from 1 cfs at the mouth of tiny Johnson Creek in August and September, to 1,000 cfs at USGS gage #14-3229 in the main stem of the Umpqua in winter.

In 1974 the Water Resources Board adopted a new set of minimum stream flows for the basin, adopting some 60 control points on 48 different stream and establishing minimum flows close to those recommended. These flows were enforced until 1977, when the Board reversed itself by suspending the minimum flow rule when enforcement would have cut off junior rights holder. Though the stream in question got to as low as 60 second-feet, the Oregon Department of Fish and Wildlife did not object to the suspension because low flows in 1973 season had already seriously damaged the fishery.

IV. Evaluation

Getting a minimum flow requirement adopted is a long and relatively costly process. In the case of the Umpqua Basin, for example, revising the initial minimum flow took 16 years. Nevertheless past experience shows that the result may be worth the time and effort if sufficient unappropriated water is available. According to the Department of Water Resources minimum flows have been successful on such rivers as the North Umpqua, the Rogue, the Deschutes, the Willamette Basin. Since 1958 state minimum flows have been established for 18 basins under the State Water Policy Statement Program; these minimum flows are to be reviewed periodically and may be revised upwards, as were those for the Umpqua Basin.

One major constraint on this strategy is over-appropriation. Where a stream is already over appropriated, a minimum flow which has the status of a junior water right is of little use when it is most needed--in the critical low flow summer season. A significant corollary of the over appropriation problem is the difficulty of enforcing an instream minimum flow over junior water rights holders in a period of water shortage. Some of the enforcement problems are administrative in nature. As a Department of Water Resources source points out, the minimum stream flow is a public right. The "public" does not like individual water rights holders, file complaints. Moreover, the personnel and facilities for monitoring streamflows are limited.

Another constraint indicated by Department of Fish and Wildlife sources is the reversability of a minimum flow established by administrative rule. Where political pressure can be brought to bear, and where the Board has the power to reverse or suspend a former rule, the established minimum flow may not survive a season of water shortage, as was true of the lower Umpqua Basin in a recent year.

Even where minimum flows are not suspended by the Board, local political and judicial attitudes may make them difficult to enforce when the choice is between damage to fish and wildlife and damage to the economic interests of holders of junior water rights. For example, a recent conflict on the John Day River between farming interests who held water rights junior to the established minimum stream flows was recently resolved by a local court in favor of the holders of the junior rights. The position of the Water Resources Department and of the State Attorney General's Office is that the Court had no jurisdiction to contradict an administrative rule arrived at by normal statutory procedures. But even if their position is correct, the case serves to point up the quasi-temporary nature of the minimum flow.

Sources in the Departments of Fish and Wildlife and Water Resources agree that the problem has political relations aspects as well as administrative and legal aspects. The problem of enforcing minimum flows arises in part from a public misunderstanding about the nature of junior water rights. Those who take out permits tend to assume that enough water will be available to serve their needs, and when they see water in the river they have a difficult time understanding why they can't use it. Also, the public lacks an understanding of fisheries needs. On the John Day, for example, the presence of large numbers of recently introduced small-mouthed bass despite low flows, obscured for some local observers the very real damage being done to the salmonid fishery.

Some officials in the Oregon Department of Fish and Wildlife are convinced that the minimum flow law will not be effective until it is tied to a program of closing over appropriated streams to further appropriation. The Department of Water Resources, on the other hand, feels such a legislative directive is unlikely in the face of a recent approval by voters of a large bond issued to build irrigation and drainage facilities.

As permits continue to be issued and water continues to be appropriated, the economic equities of the hardships on junior water rights holders are more and more likely to be argued both in the courts and before the Board. Nevertheless, the Oregon minimum streamflow law and the administrative process which enforces it have been successfully employed in the past and are likely to be applied in the future.

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STATE MORATORIA ON NEW APPROPRIATIONS

I. Identification

Though the Oregon legislature has withdrawn certain lakes and stream reaches from appropriation to preserve scenic and recreational features and to reserve flows for fish life (see Ore. Rev. Stat. § 538), there is no general statutory moratorium on stream appropriations. There is, however, statutory provisions for withdrawal of streams from appropriation by administrative means. Under the present laws, the Water Policy Review Board has authority to withdraw streams from appropriation and to classify streams for particular beneficial uses. (See O.R.S. § 536.410). According to sources in the Oregon Fish and Wildlife Department, a strategy currently being explored is getting the legislature to review the minimum stream flow laws (See strategy entitled State Appropriation of Instream Flow) and give the Water Resources Department a clear policy directive to place ceilings on appropriations.

The Water Policy Review Board employs the administrative rule to withdraw a stream from appropriation or to classify a stream. A withdrawal ruling can be a withdrawal "in perpetuity," subject to repeal by the Board itself. In the past, the Board has interpreted the withdrawal power as the power to withdraw a stream from appropriation on a temporary basis by means of a temporary administrative rule, which has a time limitation of six months. However, there is now some question whether the board may withdraw a river from appropriation for a period shorter than perpetuity. A 1975 State Attorney General's Opinion, completed before the creation of the current Board concludes that the Board has no power to withdraw a stream from appropriation on a temporary basis.

II. Application

The withdrawal power of the Water Policy Review Board may be exercised, according to the Act, to insure compliance with State water policy and to protect the public interest. Notice and a public hearing are required before such a withdrawal can be implemented.

Because Oregon divides administrative policy-setting power between the lay water policy board and the policy department of the State water agency, it is difficult to identify the place where appeals and pressure will produce the most favorable results for reserving instream flows. On the one hand, the board has the highest level authority for creating policy decisions, and the Water Resources Department is legally bound to adhere to its directions. On the other hand, the board operates by considering specific questions put before it by the Water Resources Director and is dependent on state agencies, notably the Water Resources Department, for the development of studies and the working out of comprehensive plans. It can approve or disapprove of the results of these studies and plans and gives general directives as to their implementation, but it is remote from the day-to-day details. The result is that the Water Resource Department bears considerable responsibility for policy in that it interprets the board's directives and translates them into specific plans and acts. Thus, application of this strategy, whether the aim is withdrawal or classification of a stream, will require convincing the Board, the Water Resources Department, and the public that such a move is necessary. The effort will probably require all of the following:

- Interdepartmental rapport and cooperation between the resource agencies and the Water Resources Department to insure that significant needs of fish and wildlife are brought to the board's attention in a form which will result in an administrative ruling

- Convincing and comprehensive data to present to the board in support of requests for rulings

- A campaign to inform the public of both the harm which will be done to fish and wildlife resources if no steps are taken and the economic as well as the less tangible values of these resources

The first of these steps requires more time than money; though progress has been made in this regard in the past, there has been some dislocation as a result of the 1975 reorganization which created the Water Policy Review Board and the Water Resources Department. The second requires both time and money; however, significant amounts of research have been going on and can be put to use in backing up recommendations. The third, which involves a public relations effort, is the most costly of all, and the one for which resource agencies are perhaps least well equipped. It is nevertheless a significant factor.

III. Illustration

Though the Water Policy Review Board has the power to issue an administrative rule closing a stream to further appropriation, it has never done so. However, both the current Board and its predecessor, the Water Resources Board, have exercised the power to classify a stream for particular beneficial uses. In some instances stream classification has been advantageous to fish and wildlife interests; in others, classification has worked to the detriment of those interests for a particular stream. Classifications of streams in the coastal basin area has been helpful to fish and wildlife interests. About 20 streams in the North Coastal area have been classified to preclude all downstream diversion for irrigation, municipal, and industrial use. This is in addition to 66 points where minimum streamflows have been established. These streams have been classified for the following uses:

- Human consumption (by individuals, not municipalities)

- Livestock

- Power use not to exceed that necessary for production of seven and one-half theoretical horsepower

- Instream uses for recreation, fish and wildlife

Examples of streams so classified are those in the Tillamook Basin area, Daily Lake and tributaries, Sand Lake, and Netart's Bay.

Many of these streams are located in wild, mountainous areas, where irrigation is not practical and municipal use is not a factor. Thus the Department of Fish and Wildlife, or its predecessors, the Oregon Game and Fish Commissions, were able to convince the Board that such limited classifications were justified.

IV. Evaluation

Though an administrative moratorium on stream appropriation is clearly available under Oregon law, in practice, a moratorium has never been declared, partly because administrative procedures are unwieldy, and partly because the administrative bodies are both reluctant to use their power and susceptible to pressure from interests such as irrigation and other consumptive users.

If a moratorium could be achieved, it would protect the minimum stream flows already established by law for fish and wildlife by preventing overappropriation. Current policy is to continue to issue water rights, subordinate, of course, to water rights issued earlier, but without regard to the total amount of water available for use. This creates an expectation on the part of permittees that water will be available. Thus, in periods of water shortage, permittees whose rights are junior to, or qualified by, a minimum stream flow for fish and wildlife, can make a good argument either before the Board or in court that they will suffer economically unless they are allowed priority over minimum stream flows for fish and wildlife. As a practical matter, the stream may be dried despite the priority of the minimum stream flow. And, of course, a moratorium is of no use where streams are already over appropriated.

Moreover, the power to call a moratorium or create a withdrawal are discretionary powers vested in a lay policy-making board which is extremely sensitive to public opinion and to political pressures. The likelihood of the board's exercising such power is lessened by such indications of political and public opinion as the recent passage of $650,000,000 bond issue for irrigation and drainage. Even if a moratorium or withdrawal is created by the board on a particular river at a particular time, it can be withdrawn by a subsequent administrative rule, so is, at best, a temporary solution. Moreover, as fish and wildlife sources point out, this strategy is piecemeal; it has no particular value as precedent and doesn't affect the comprehensive water plan.

Classification, on the other hand, can work well for fish and wildlife uses, provided that old classifications can be reviewed periodically and provided that classification works hand in hand with minimum stream flow designations. This point is illustrated by the classification of the Coastal Basin streams. However, classification has its negative aspects for fish and wildlife, too.

The Umatilla is an example of a case where the classification power has worked to the detriment of fish and wildlife uses. The Umatilla is located in an agricultural area with a strong agricultural lobby. Limited water is available in the river, and local irrigation districts are strong. Some twenty years ago the then Water Resources Board classified the stream for only one use--irrigation. Since fish and wildlife were not considered a beneficial use for this river, no minimum stream flows were established. About 1960 the classification was amended to include municipal and industrial use, but there has been no amendment to include fish and wildlife use. Consequently, in a recent period of low flow, fish and wildlife interests came into conflict with farming interests when winter flood waters were diverted for groundwater recharge. State law forbids the mining of groundwater, and certain farmers and ranchers had been instructed to stop pumping ground water; hence, the plan to recharge using river water.

Even though recharge of ground water has less priority than fish and wildlife use in the Oregon Water Code's list of beneficial uses, the fact that the Umatilla had been classified so as to preclude fish and wildlife use prevented it from taking action to preserve the instream flow. A suit against the Water Resources Department was filed by the Department of Fish and Wildlife, but was withdrawn.

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STATE DISCRETIONARY WATER PERMIT AUTHORITY

I. Identification

In Oregon, discretion may be exercised on two administrative levels: either the Water Policy Review Board, or the Department of Water Resources, or both, may make decisions which affect the granting of water permits.

The Water Policy Review Board in connection with its responsibility to formulate an integrated, coordinated program for the use and control of State water resources, has the authority to issue general policy statements, to set minimum instream flows under the State minimum streamflow law (see strategy entitled State Appropriation of Instream Flow), and to classify streams as to beneficial use (see strategy entitled State Moratoria on New Appropriations). Recreation, wildlife, and fish life uses are declared to be beneficial uses by Ore. Rev. Stat. § 536.300.

Once the Board has classified a stream as to beneficial use, it is the responsibility of the Department of Water Resources to issue permits in line with the Board's classification. However, if the Director of the Department believes a proposed appropriation may be prejudicial to the public interest, he must refer the matter to the Board, which may then determine that the water could better be applied to another beneficial use. The Board is guided in its determination of the public interest by statutory criteria (Ore. Rev. Stat. § § 537.170).

The division of the Water Resources Department which actually grants permits also has discretionary power. It may, under the guidance of the Director of Water Resources, approve or deny applications and impose such terms and conditions upon permits as are necessary to protect public interest (Ore. Rev. Stat. § 537.190). The Department is guided by the Water Policy Review Board's classifications as well as by its general policy statements.

II. Applications

Contributing members to study committees, participating in public hearings on policy matters, and establishing a good working rapport with concerned officials of the Water Resources Department are ways in which resource agencies such as the Department of Fish and Wildlife may influence the discretionary power of the Water Policy Review Board (see strategy entitled State Moratoria on New Appropriations). More specifically, however, the permit application procedure itself has a built-in mechanism forgetting input from fish and wildlife interests.

The Department of Water Resources may include in a water permit any condition necessary to protect existing public rights. For example, the permit may state that a reservoir may be filled only in winter when there is excess water; irrigation or mining use permits may be issued on a seasonal basis; conditions as to rate of flow may be set up; a right may be issued for a quantity of water to diminish over time as other uses require more. In addition, restrictions on the amount of time allowed for beginning and completing the project are included in all permits, so that an applicant may not acquire an early priority for a use contemplated for the distant future. The Department may cancel any permit where the permittee is not using the water according to the permit restrictions.

Permit application procedure requires a holding action for 30 days after each water permit application is filed to allow any interested party to protest the application. The Water Resources Department compiles a weekly list of all new permit applications. A copy of this list is sent to the Department of Fish and Wildlife and other interested agencies, which then have an opportunity to file a protest to the application.

Where an application conflicts with fish or wildlife use the Department of Fish and Wildlife first attempts to negotiate with the applicant for a stipulation of an instream flow reservation in the permit. The applicant, knowing that a protest may be filed, may be willing to comply with the Departments request in order to expedite approval of his application. According to a member of the Oregon Department of Fish and Wildlife, the Water Resources Department encourages the negotiation of stipulations. If negotiations with the applicant are successful, the application is refiled with the agreed conditions and stipulations and, as revised, the application is approved. If the applicant does not agree to a stipulation, the Department of Fish and Wildlife may elect to file a protest. A protest must allege either injury to the water right of another or prejudice to the public interest. The next step is a hearing, with the Director of the Department of Resources ordinarily serving as hearing officer. Ordinarily this ends the process; after the hearing the director usually either grants the permit as applied for or imposes conditions and restrictions before granting the permit.

To implement this strategy, the Department of Fish and Wildlife must review proposed water permit applications, ascertain whether a given application concerns a stream which has been classified for fish and wildlife use, negotiate with the applicant, and, if necessary, prepare a protest. No special costs are incurred by the Department in working up data for permit protests since the Department has access to comprehensive basin studies periodically compiled and updated.

III. Illustration

The Booher project on Bennett Creek illustrates the successful use of Oregon's water use permit system to get an instream flow reservation included in a water permit. Booher Diversion Dam on Bennett Creek, eight miles southeast of the city of Drain in eastern Oregon's Douglas County, regulates a one-mile reach of a small creek in the Umpqua River system. Though there is no minimum streamflow set for Bennett Creek, the Umpqua system has been classified by the Water Policy Review Board to include fish and wildlife as beneficial use. The serpentine stream flows through a three-quarter-mile-wide shoestring valley used mainly for cropping and grazing. There are beaver dams nearby on Beaver Creek. Heavy cover and appropriate water conditions provide a coldwater fishery in Bennett Creek.

The parties involved in this project were the dam builder, Michael D. Booher of Yoncalla, Oregon; the permit authority, the Oregon State Engineer, now the Oregon Department of Water Resources, Permit Division; and the Oregon State Game Commission (OSGC), now the Oregon Department of Fish and Wildlife.

The main purpose of Booher Dam is diversion of water from the creek for irrigation. In 1971 Booher requested a permit from the State Engineer to appropriate two acre-feet of water from Bennett Creek. His proposal included plans to build an in-channel, six-foot high, concrete-and-wood dam with concrete abutt-ments and removable stoplogs. Upon being notified of the proposed development, the OSGC conducted a field investigation; after an "eyeball" field observation, the Department recommended a minimum flow of 0.1 cfs below the dam from June 1 to October 1 to provide potholes for rearing habitat for steelhead, salmon, and resident trout; it also requested that the stoplog be removed from October 1 to June 1 to allow fish passage upstream and downstream. Booher agreed to the flows and passage recommendations in return for a promise that the State Game Commission would not protest his application. This stipulation agreement was included in the water-use permit granted to Booher by the State Engineer in 1972. The capability of the OSGC to protest the permit, together with the explanation of an OSGC biologist that the recommended flows would maintain certain fish species without significantly impinging on irrigation uses, were the reasons Booher gave for agreeing to the stipulation.

Though no gaging station is located below the dam and no follow-up study has been conducted, circumstantial evidence indicates that the recommendations are being implemented. The dam was constructed with a low-level outlet so that when flows are insufficient to spill over the dam, water can be released to maintain the flow. Booher states that the permit requirement and pressure from downstream users assures that at least the recommended amount will be released. The project has generally maintained pre-project flows; however, according to the dam operator, summer flows are higher than pre-project flows because of the dam's retention of water during high-flow periods and because of its low-flow release capabilities.

Costs involved in the Department of Fish and Wildlife's action on the Booher project were mainly incurred for staff time required to make field observations and negotiate with the permit applicant.

IV. Evaluation

As the Booher illustration shows, this strategy has been successful even on small streams where minimum flows have not been set. Negotiation between the Department of Fish and Wildlife and permit applicants can streamline the process by making formal protest and administrative hearing unnecessary. The protest power gives the Department of Fish and Wildlife useful leverage in getting applicants to consider fish and wildlife needs in their appropriations. The negotiation step provides flexibility so that stipulations can be tailored to the situation. For example, an applicant will agree to stipulations for one project in return for a promise not to protest another project.

A source in the Oregon Department of Fish and Wildlife reports that the Department of Water Resources is generally receptive to Fish and Wildlife's recommendations. However, in a recent interdepartmental exchange regarding instream flow problems, the Department of Water Resources offered a rebuttal of the Department of Fish and Wildlife's biological information. This suggests that a protest backed up with firm and recent data may fare better than one based on vague or outdated recommendations.

According to the Department of Fish and Wildlife, the Department of Water Resources does not often take the initiative in referring instream flow matters where fish and wildlife needs are at stake to the Board. Whether this is because of a bias toward consumptive use or because fish and wildlife interests are sufficiently good watch dogs so that the Department need not perform this function is unclear.

A most significant legislative and administrative constraint on this strategy is the beneficial use classification which the Board has assigned to the stream in question. If the stream is not classified for fish and wildlife, the Department of Water Resources will have no basis for delaying the permit on fish and wildlife grounds, and the Department of Fish and Wildlife will have no leverage in negotiation with the permit applicant, since the protest power will not come into play. This, at least, is the view of the Water Resources Department. Some Department of Fish and Wildlife sources believe that other statutory authority exists which should allow a protest to be entertained despite the beneficial use classification of the stream. However, a recent court case arguing that position was withdrawn and the issue has not been decided. In the Booher case the stream was part of a system classified for fish and wildlife; consequently, the views of the Department of Fish and Wildlife on stream flow requirements had some clout in the negotiation process.

Another constraint is a practical one. The costs involved in this strategy are chiefly those of gathering the necessary biological and hydrological data and collating it effectively for use in negotiation with applicants, or, if necessary, for arguments in support of a protest. Keeping accurate data on small or inaccessible streams is difficult. Likewise, on a small or inaccessible stream, it may be difficult to quantify the amount and nature of damage which would be done by a project. In the Booher project there was no stream gage by which to measure flows. The "eyeball" technique had to be applied in the field.

Still another constraint is the piecemeal nature of project-by-project negotiation and protest. A negotiated permit stipulation especially, has no value as precedent. A successful protest, on the other hand, may be of value as precedent, since a hearing will be held and Director must issue an opinion in support of his decision. Though each permit application is considered separately, there is some indication, according to the Department of Fish and Wildlife, that the Department of Water Resources is attempting to establish a standard and build a set of precedents for deciding on future permit applications. The protest procedure requires that the Director issue an opinion setting forth the reasons for his decision following a hearing. Such opinions will perhaps serve to guide future decisions in similar cases.

The Oregon Department of Fish and Wildlife indicates that this strategy will continue to be successfully applied in the future, when the Department has enough information to make a good case for issuing a conditional permit, and where the stream classification gives fish and wildlife interests a legitimate reason for invoking the public interest.

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LEGISLATIVE AND ADMINISTRATIVE CONTROLS

FEDERAL REAUTHORIZATION OF PROJECTS

I. Identification

Reauthorization of a Federal water resource project to provide for increased flow releases so as to reserve instream flows involves Congressional passage of legislation modifying the original authorizing legislation. After the sponsoring construction agency conducts feasibility studies, which include comments of the Fish and Wildlife Service, the appropriate Congressional Committee drafts new legislation or amends the original authorizing legislation. The legal basis of this strategy is the Congressional authorization process for water resource projects and construction agency guidelines and procedures for authorizing and modifying water resource projects.

II. Application

This strategy may be pursued when the reauthorization of a water resource project could rehabilitate or markedly improve the downstream fishery. Interest groups of fishermen or conservationists might instigate this strategy; the Fish and Wildlife Service or Oregon Department of Fish and Wildlife might also. A U.S. Senator or Representative could introduce reauthorizing legislation. Realistically, however, for this strategy to be successful, the construction agency, such as the Bureau of Reclamation or Corps of Engineers, must initiate the process by agreeing to study reauthorization and support it before Congress.

There is a number of important decision points in the formulation and implementation of this strategy. Those encouraging the strategy must decide to lobby the construction agency for action. The construction agency must decide whether to support a study of reauthorization. Once a study is completed, the construction agency may decide to modify the project and, if so, must also decide whether to seek Congressional reauthorization. If the modification is minor, the construction agency has the discretionary authority to alter project operations without Congressional approval. In instances involving instream flows, however, the construction agency would probably seek Congressional approval because of the normally controversial nature of such a modification. To secure the approval of Congress, the construction agency would conduct and submit a feasibility study justifying the proposed change.

Legislation reauthorizing a Bureau of Reclamation project must be approved by the Subcommittee on Water and Power Resources of the House Committee on Interior and Insular Affairs and by the Subcommittee on Public Lands and Resources of the Senate Committee on Energy and Natural Resources. Corps of Engineers projects must be approved by the Subcommittee on Water Resources of the House Public Works Committee and by the Subcommittee on water Resources of the Senate Committee on Environment and Public Works. After reviewing the feasibility report of the construction agency, these committees must decide whether to reauthorize. According to Congressional staff members, as long as there is no significant political opposition, the committees will approve the reauthorizing legislation.

This strategy is costly in term of money and time. The construction agency and fish and wildlife agencies must fund and conduct a feasibility study to justify the modification and reauthorization of a project already planned and constructed. The reauthorization process takes almost as long--5 to 10 years--as the original authorizing process. The legislation must then be approved by both houses of Congress and signed by the President.

III. Illustration

Although the process is not yet complete, the proposed reauthorization of Prineville Reservoir illustrates the application of this strategy in Oregon. Prineville Reservoir is located on the Crooked River, a tributary of the Deschutes, about 15 miles southeast of the city of Prineville in central Oregon. The reservoir, created in 1960 by BR's construction of Arthur R. Bowman Dam, is the major storage facility of the Crooked River Project; it has an active storage capacity of 153,000 acre-feet.

According to a Draft Report to the Commissioner of the Bureau completed in August, 1977, Prineville Reservoir was originally designed to utilize the optimum economic capacity of the site for the purpose of providing water storage to meet existing irrigation needs and also for the development of other lands in either the Crooked River subbasin or the main Deschutes River basin. However, except for the space placed under contract during the construction period or soon thereafter, very little of the remaining space has been sold. In August 1977, 70,300 a.f. of space was under contract, the remaining 82,700 a.f. of active capacity was still uncommitted. This uncommitted storage is being used in the interim as a conservation pool for fish and wildlife and for recreation as well as for instream flow releases. Though these developments, were unanticipated, they have occurred. Consequently, if large drawdowns for irrigation or decreased instream flows occur in the future, serious damage to the existing recreation facilities, fishery, and wildlife resources will result.

The authorized purposes of the Prineville project under the Act of August 6, 1956 (70 Stat. 1058) were flood control, basic minimum public health and safety facilities, minimum streamflows for fish and wildlife enhancement, and water for irrigation. Amendments passed in 1959 and 1964 permitted the construction of additional irrigation facilities and increased the land area receiving water; the water for this extension of the project came from uncommitted storage space provided under the original Act. Between 1960 and 1970 the Bureau conducted studies to identify arable lands which could be irrigated by using the remaining uncommitted storage. However, by 1970, the costs of constructing and operating projects had risen so high that the proposed plan was no longer economically feasible. No action was taken to commit the uncommitted storage, and further studies were tabled.

In late 1974, the Bureau received requests to utilize the uncommitted storage from the North Unit Irrigation District, the City of Prineville, the Oregon Department of Fish and Wildlife, and other agencies and individuals interested in using the water. Because the only use contemplated by the original authorization for the uncommitted storage was irrigation, Congressional action is required to apply the water to other beneficial uses. Accordingly, the Bureau began studying reauthorization and developed several alternative plans. After a series of public hearings in 1975, a list of seven alternative plans, ranging from the use of all the remaining uncommitted storage for fish and wildlife and recreation to the use of all of it for irrigation, was submitted to each agency or interested group, including the Oregon Department of Fish and Wildlife, for evaluation. The Bureau used these evaluations to arrive at the following plan, which combined several alternatives.

Of the 153,000 acre-feet of total active storage space in Prineville Reservoir, 55,000 acre-feet would be allocated toreservoir recreation, fish, and wildlife; 4,700 acre-feet would be used to increase the minimum downstream flow; 90,300 acre feet would be allocated to irrigation; 3,000 acre feet would be allocated to domestic, municipal, and industrial water supplies; and 60,000 acre feet would be assigned to flood control.

The 55,000 acre feet allocated to the reservoir conservation pool would maintain high water levels in the reservoir during poor water years. The 4,700 acre-feet for increased minimum downstream flows would raise the authorized minimum flow from 10 cfs to 75 cfs in good water years and 30 cfs in poor water years (whenever the reservoir content, measured on a monthly basis, drops below 85,000 acre feet). The recommended plan increases minimum flows considerably above the currently authorized minimum of 10 cfs; however, actual stream flows on the project normally are in excess of 75 cfs. These stream flows, if authorized, will guarantee that the existing valuable trout fishery which has developed below the dam is preserved.

The plan to reauthorize the uncommitted space in Prineville Reservoir is still being considered by the BR. A draft report to the Commissioner was completed in January, 1978. Several hearings have been held; however, preparation of a final draft will not be done until Environmental Impact Statements are received. FWS and the Oregon Department of Fish and Wildlife were involved in the recommendation process; at the request of the BR, FWS prepared a series of reports which evaluated information gathered by the BR Regional Planning Office. The Oregon Department of Fish and Wildlife cooperated in this evaluation and concurred in the recommendations submitted by FWS. Thus, the resource agencies were able to contribute significantly to the recommend plan while incurring minimal costs for studies and personnel.

Because of Prineville Reservoir's unusual situation (uncommitted storage authorized for irrigation, together with decreased demand for irrigation water) fish and wildlife benefits became an important bargaining factor. Thus, the fish and wildlife interests and State recommendations had significant impact.

Sources in the Oregon Department of Fish and Wildlife and the FWS feel that the proposed plan, if implemented, will be successful in protecting existing fish and wildlife resources while at the same time accommodating other uses.

IV . Evaluation

As shown by the Prineville illustration, the strategy of project reauthorization can successfully provide for increased flow releases. For several reasons, however, reauthorization is an ususual occurrence, particularly for fish and wildlife purposes. Once a water resource project is constructed and operating, the fishery interests and the construction agencies have little incentive to incur the expense and time needed to reassess project operations unless a combination of distinctive factors is present. As illustrated by the Prineville reauthorization, important factors are the threat to a valuable resource, great demand for project modification, absence of organized opposition, and the availability of uncommitted storage.

Other factors in a successful outcome include increased benefits from reauthorization and the ability to recover the losses caused by changing the use of some water stored in the reservoir. For example, the case of the Prineville Reservoir, the large amount of authorized but uncommitted water storage allowed the development of a valuable fish and wildlife and recreational resource. At the same time, further development of irrigation has become less economically feasible. Thus, reauthorization for fish and wildlife will give the project a more favorable benefit-cost ratio.

Because a unique combination of factors is required for the successful implementation of the strategy, both Oregon Department of Fish and Wildlife and FWS personnel believe it probably will have limited application in the future. Still, if the right combination of factors does occur, this strategy offers two noteworthy advantages. It provides a long-term solution with a firm legal basis. The reauthorizing legislation legally guarantees the necessary flows in perpetuity or until the legislation is again amended. The strategy's chief disadvantage is the length of time required to obtain a reauthorization.

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STATE-FEDERAL WILD AND SCENIC RIVERS SYSTEM

I. Identification

The addition of a stream segment to the Federal Wild and Scenic Rivers System, which provides for reservation of flows sufficient to accomplish the purposes of the Act, involves administrative and/or legislative action provided by the National Wild and Scenic Rivers Act (P.L. 94-486). Designation as a wild or scenic river has the effect of reserving historical instream flows since new stream diversions and impoundments are prohibited and may be restricted below or above the designated river segment. If a river is to be managed entirely or partly by a Federal agency, or if it lies wholly or partly within a National Park, Forest, Wildlife Refuge, or other Federal land, an act of Congress is required. The Secretary of Interior can grant a Federal designation if the river is part of a State river protection program.

In 1970, the Oregon Legislature passed the Oregon Scenic Waterways Act (Ore. Rev. Stat. 390.805 to 390.925). However, designation of a river under the State Act does not reserve instream flows. The State Act is essentially a land-use act regulating private land use along the banks of the designated rivers. Declared State policy permits "appropriate" dams and impoundments while preserving the free-free-flowing character and natural setting of designated rivers. Administration of the State Act is under the State Highway Commission. Designation can be accomplished either by a procedure designated in the Act or by direct legislation.

II. Application

Under the Federal Act this strategy can be applied where a free-flowing river or stream segment is at least 25 miles long and bordered by a visually appealing landscape. The Wild and Scenic Rivers Act defines river segments as wild, scenic, and recreational:

> Wild river areas are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. Scenic river areas are free of impoundments, with shorelines largely undeveloped, but accessible in places by roads. Recreational river areas are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

The Forest Service and Heritage Conservation and Recreation Service have published clarifying guidelines for determining river segment classifications.

Although the Oregon Department of Fish and Wildlife, the FWS, and the HCRS may be able to initiate action by local interests, the local citizens themselves must organize and demonstrate local support to convince their Members of Congress to introduce a bill. The HCRS is conducting a national inventory to determine suitable river segments to recommend to Congress for detailed study.

Congress must pass a bill authorizing a study of the river in question. Such bills must go through the legislative process, including hearings before the House Interior and Insular Affairs Committee and the Senate Energy and Natural Resources Committee. If a study bill passes and is signed by the President, the Forest Service--if the river flows through a National forest, or the HCRS in all other cases--will work with state and local officials to inventory the river's resources and solicit views of the local landowners and citizens. The study may cost approximately $200,000. If the river proposed meets the criteria, the study team will recommend:

- Classification of various river segments
- Acreage to be included in the river corridor
- Acquisition of land and easements
- Development of recreational facilities
- Assignment of a managing agency.

The study report, along with a Draft Environmental Impact Statement and a Draft Management Plan, is reviewed by agencies including the FWS and the State fish and game agency, by the public, and then submitted to Congress and the President. After clearance by the Office of Management and Budget, the President makes a recommendation to Congress. Given sufficient interest, Congress will schedule hearings to discuss the study report. Congress is free to accept all, some, or none of the recommendations. If Congress passes a bill which approves the designation(s) and the President signs it, the agency to administer the river segment will prepare detailed boundaries for river corridor and prepare a Comprehensive Management and Development Plan. Congress must then appropriate money for acquisition of land and easements, construction of visitor facilities, and operating expenses such as salaries of river administrators.

The Congressional designation of a river segment takes several years from the time that Congress authorizes a study. Once a river is declared a study river, it must be designated within 10 years or dropped from consideration. However, the Federal Act protects the river segment under study from the authorization, funding and construction of water resource development projects, as well as restricts development above and below the study segment which would have an adverse effect. The Secretary (Interior or Agriculture) charged with the administration of the river segment would determine if the values for which the river was designated would be adversely affected by development. The Act also protects these rivers for up to three years after the study report is submitted to Congress and the President, regardless of whether or not the river is to be included in the system. All minerals located on Federal lands within one-quarter mile of a study river are withdrawn from prospecting or leasing during the study period.

Though the Oregon Scenic Waterways Act has no provision for reserving instream flows, there is an apparent relationship between the purposes and policies of the Act and those of reserving instream flows for fish and wildlife. Water Resources Department source has indicated that designation of a river under the Act would be one of the facts taken into consideration when minimum flow designations are being reviewed (see strategy entitled State Appropriations of Instream Flow). However, most minimum flows now in effect were set before the Scenic Waterways Act was passed, most recent revisions of instream flows were done by the Water Resources Board before 1975. That Board's successor, the present Water Policy Review Board, has not yet acted on an instream flow question. Resource agencies such as the Oregon Department of Fish and Wildlife can influence State action in getting a stream included as part of the State Scenic

Waterways system by means of participating in study committees. The initial analysis of a stream's potential for the purposes of the Act is done by the Department of Transportation, Parks and Recreation Division. Study Committees consist of members of the Department of Transportation, the Water Resources Department, and all interested resource agencies. If the Department of Transportation recommends inclusion in the State Scenic Waterways system, it is subject to the approval of the Water Policy Review Board, as is any application for a variance or for condemnation and purchase after the stream has been included. The Department of Fish and Wildlife participated in study committees on all the rivers currently designated under the State Scenic Waterways law: The Rogue, The Deschutes, The John Day, The Minam, and The Owyhee.

III. Illustration

The Rogue River is located in Southwestern Oregon; it flows through mountainous country from its source in Jackson County through Josephine and Curry Counties and a section of the Siskiyou National Forest, emptying into the Pacific at Gold Beach. A segment of the Rogue extending from the Applegate River west of Grant's Pass, Oregon, downstream to the Lobster Creek Bridge was among the eight "instant" wild rivers designated in the Federal Wild and Scenic Rivers Act in October, 1968. Thirty-three miles are designated wild, 7.5 miles as scenic, and 44 miles as recreational, a total of 84.5 miles. Much of the river is wild in all senses of the word; there are no calm stretches; boaters rate the rapids as difficult.

The Rogue fishery contains several important species. Coldwater species include salmonids; winter and summer steelhead, spring chinook, fall chinook, coho salmon, and resident trout. Various warmwater species live further upstream, in a wetland habitat resulting from sediment fill behind an old power company dam now part of a park operated by Jackson County. This wetland habitat also supports a large heron rookery. Despite disadvantages for the coldwater fishery, the Oregon Department of Fish and Wildlife supports retaining this dam in the system because of the advantages for wildlife. The main reason for instream flows for fish and wildlife on the Rogue is to maintain cool water temperatures in the summer for the salmonids.

The management of the Rogue is divided between the BLM, which is responsible for the stream reach extending from the Applegate River to Marial and the Forest Service, which manages the stretch included in the Siskiyou National Forest--from Marial to the Lobster Creek Bridge. But neither Federal management agency has a direct way to control the instream flows in the Rogue; the State of Oregon controls appropriation from the stream through its water permit system and minimum stream flow law. Theoretically, the Federal Government has a "right" to enough instream flow to fulfill the purposes of the Wild and Scenic Rivers Act, dating from the enactment of that law in 1968. But local watermasters, lacking any specific guidelines regarding streamflow for these purposes, enforce the permits without reference to this priority.

In 1966 the Oregon Water Policy Review Board set minimum flows for the Rogue of 1200 cfs at Gold Ray (or Raygold) Dam and Savage Rapids Dam and 935 cfs at the river's mouth. Minimums set earlier in 1959 were 1000 cfs at the dams and 735 cfs at the mouth. There are no state minimum stream flows dating back past 1959. Consumptive water use permits have been issued for irrigation, municipal, and domestic uses (excluding use for mining or power) for approximately 700 cfs for the upper basin and 2000 cfs for the middle basin.

Until recently, the Rogue was an unregulated river. In 1977, however, with the closing of Lost Creek Dam at River Mile 158, approximately 40 miles upstream from the wild segment designated by the Act, this ceased to be true. The dam is actually of benefit to fishery interests, however, because it contains a storage pool, purchased by the Oregon Department of Fish and Wildlife for just that purpose. During the 1977 summer season, when flows were more than normally low, Lost Creek released 900 cfs of water, 150 cfs more than was coming in to the recently closed dam.

The Oregon Department of Fish and Game and FWS participated in negotiations with the CE for storage space in the Lost Creek Reservoir and applied for the necessary State water permits (see strategies entitled State-Federal Flow Requests Made Early, State-Federal Flow Requests Made Specific, and State-Federal Combined Storage and Flow Requests). This storage is used to back up the minimum flow designated for the Rogue River under Oregon's Minimum Stream Flow Law (see strategy entitled State Appropriation of Instream Flow).

The Oregon Department of Fish and Wildlife conducted studies used to support the Lost Creek Reservoir fish and wildlife allocation over a ten year period. The Department estimates that it devoted one-person year to obtaining this allocation, which ensures minimum flows in the wild and scenic segment of the Rogue.

IV. Evaluation

This strategy has demonstrated some past utility in Oregon, since the Rogue and segments of the Snake are designated as part of the Wild and Scenic Rivers system, and the Illinois and another segment of the Snake are among those now being studied. The Act does tend to reserve flows in sufficient quantities to carry out the purpose of the Act. However, the Act is not specific enough to provide a direct means of establishing instream flows; it establishes a general policy but its management principles are vague. Specific flows have not been established under Federal management; the management agencies must depend on State authorities for that.

Even if a flow sufficient for the purposes of the act were to be quantified, that flow might not be sufficient to maintain a critical fishery, since the chief factor in establishing a minimum flow for navigational purposes is water depth, whereas the critical factor for coldwater fisheries is often water temperature.

The designation of a river or stream segment under the National Wild and Scenic Rivers Act (Section 13, part c) tends to reserve flows in quantities sufficient to accomplish the purposes of the Act. The Act prohibits new water resource development in the designated segment and restricts water resource development upstream and downstream which would adversely affect the designated river segment. It is a serious shortcoming, however, to take this approach to reserving flows without actually quantifying the streamflow regime that underlies the wild or scenic river designation, and monitoring the flows to ensure their maintenance, possible by augmenting deficient flows with reservoir releases upstream from designated segments. The Act does not prohibit existing water users along a designated river segment from continuing their use; it only prohibits new appropriations. In fact, the Act states that any taking by the United States of a water right which is vested under either state or Federal law at the time a river is included in the national System shall entitle the owner to just compensation.

Whether the act as it is presently constituted would enable a Federal management agency to reserve flows by means of a condemnation procedure is a point which is being raised among management personnel. There is a Solicitor General's opinion that § 13 (c) and (d) allows condemnation if flows are insufficient to carry out the purposes of the act. However, local influences might counteract such a move as they did in Idaho where the Hells Canyon Act as passed with specific provisos denying the Act's authority to condemn water rights.

Another possibility suggested by the BLM is application to the State water permit authority to cancel water rights which are invalid because of failure to use the water beneficially (see strategy entitled Condemnation and Reallocation of of Water Rights). This procedure is already possible under Oregon law, which provides for loss of water rights intentionally abandoned or not used for five successive years or more. The rights thus cancelled could, again, according to the BLM, be used by the BLM for instream flows, since the 1968 Act pre-empts State law regarding the requirement of a diversion for instream flow reservation. However, the BLM would be dependent on State cooperation for enforcement of such reservations.

Inclusion in the System also protects the river segment from Federally funded water resource development. Therefore, no Federally funded dams and reservoirs will be built on designated river segments. However, this in no way guarantees that sufficient flows will occur to preserve the developed fish and wildlife resources. Some means of linking instream flow needs of fish and wildlife to this process for streamflow protection will be necessary. The Rogue River represents an anamalous yet potentially promising situation. Here a wild, scenic, and recreational river is being managed simultaneously and in conjunction with an upstream dam and reservoir project. Releases from the dam increase the streamflow and improve the fishery. In 1977, the FWS, in conjunction with western state fish and game agencies, conducted a study which identified and mapped stream segments having substantial fish and wildlife value. The results from this study may be used by the HCRS when it expands its own study in 1978 to identify additional stream segments for inclusion in the Wild and Scenic Rivers System.

Future effectiveness of this strategy will depend on developing and maintaining local support and be constrained by the substantial costs involved in its implementation. The Congressional approval required to study a river segment and include it in the national system may take several years. Nevertheless, the strategy does provide for a permanent maintenance of historical flows and prohibits future Federal development. Its future effectiveness will hinge most of all on relating streamflow maintenance to quantifiable fish and wildlife values. This quantitative link is not inherent in the National Wild and Scenic River Act, but it may be possible to bridge the gap administratively.

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STATE DEFINITION OF NAVIGABLE WATERS

I. Identification

Navigability has been judicially defined in Oregon as a question of fact; those waters which are capable of supporting commercial navigation are deemed navigable. The public trust in the navigable waters of the State extends to the use of these waters for fishing and recreation as well as navigational uses. (Luscher v. Reynolds, 153 Ore. 625, 56 P. 2d 1148 (1936)).

II. Application

This strategy involves using the legal concept of the public trust in state navigable waters as the basis for a State establishment of instream flows. Since the public trust doctrine is a judicial doctrine, its application would probably result in a court test of the applicability of the dotrine to instream flows for fish and wildlife. The argument asserts that the State's interest in fishery resources is a property interest, and that the State holds the resource in trust for the people. This argument could be used by the State Department of Fish and Wildlife and other State resource agencies to protect the public's interest in fishery resources in water rights adjudication proceedings and by the Department of Water Resources to limit discretionary authority to issue permits on streams which are overappropriated.

If a court test is necessary to establish the legal force of this concept, costs might be considerable; however, there is no cost to using the argument, where appropriate. In Oregon, because of the Minimum Streamflow Law and the considerable discretionary power of the Water Policy Review Board, State agencies have not perceived a need for this strategy.

III. Illustration

No illustration of this strategy in Oregon could be identified.

IV. Evaluation

Sources in the Water Resources Department believe that such a doctrine is contrary to the basic assumptions of the Minimum Streamflow Law. Further, they believe the question is not likely to arise since Oregon law defines navigable waters as waters which are in fact navigable, navigable rivers in Oregon are likely to be the large rivers; the Water Resources Department feels that this insures that water shortages are not likely. However, this view ignores problems such as flow fluctuations below power dams.

A representative of the Department of Fish and Wildlife pointed out that keeping streams navigable for fish and wildlife purposes is a condition of Statehood in the Oregon Statehood Act. The State Attorney General's office has handled cases where the State's interest in the riparian property bordering a navigable stream (up to the high-water mark) was asserted successfully against a riparian property owner, but no cases asserting the State's interest in the streamflow itself has come up.

Despite the apparent legal basis for this strategy and the existence of a state judicial definition of navigability, neither Department of Fish and Wildlife officials nor Water Department personnel have yet considered applying it to a specific situation in Oregon.

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STATE-FEDERAL INTERAGENCY CONSULTATION

I. Identification

Whenever a Federal agency constructs, modifies, or licenses a reservoir project, it must consult with the Fish and Wildlife Service and the Oregon Department of Fish and Wildlife to obtain and consider their recommendations concerning fish and wildlife resource preservation and development, including the provision of instream flow. Refining and formalizing this consultative process is the goal of this strategy. The formulation and adoption of interagency agreements, construction or permit agency regulations or formal procedures, and strict enforcement of these requirements are tactics available to implement this strategy.

The legal or administrative basis for this strategy is the Fish and Wildlife Coordination Act (FWCA) and the regulations or procedures the Federal construction and permit agencies have developed to implement the Act. The FWCA (P.L. 85-264) passed in 1958, expanded upon the Act that created the FWS in 1946 (P.L. 79-232). The FWCA requires that full consideration be given to the recommendations of the FWS; the 1946 Act only required consultation between the construction agency and the Federal and state fish and game agencies.

II. Application

The FWS, the Oregon Department of Fish and Wildlife and a private interest group are the parties who would instigate this strategy. At the present time, neither the Bureau of Reclamation, Soil Conservation Service, Forest Service nor Bureau of Land Management have an interagency agreement with the FWS at either the regional or headquarters level to implement the FWCA. The Corps of Engineers has a cooperative agreement with the FWS, enacted in 1954. This agreement will be discussed as an illustration of this strategy. All of these agencies, though, do have formalized procedures to implement the FWCA. In addition, the Corps will soon be issuing regulations concerning their implementation of the FWCA. A review of these procedures and proposed regulations is necessary to assess the decision-making and costs involved in implementing this strategy.

According to the Bureau of Reclamation policy, coordination in all phases of planning should include:

- Early notification by the BR of the initiation of planning studies
- Opportunity for the FWS to participate in the formulation and evaluation of project plans
- Opportunity for the FWS to provide reports to the BR, including recommendations relating to fish and wildlife aspects of plans or proposals.

FWS reports on BR projects are funded by the Bureau. Congress allocates funds to the FWS through the BR's Washington office which disburses funds to the FWS through the Regional Offices. Beginning in 1978, such funds will not be earmarked in the appropriation act and disbursed from Washington, but rather will be transferred at the field level.

Although not referring explicitly to the FWCA, the SCS procedures do specify that Federal and State fish and wildlife agencies be encouraged to participate actively in project planning and to incorporate measures needed in each project to the maximum extent feasible. According to Forest Service Procedures,

> . . . it will be the policy of the Forest Service to refer to the Fish and Wildlife Service and/or the appropriate state fish and wildlife agency, all proposed projects which have a potential for affecting fish and wildlife resources to such an extent as to warrant the investigation and recommendation of these agencies.

The BLM's regulations and procedures do not refer to the FWCA, but their new organic act, the Federal Land Policy and Management Act of 1976 (P.L. 94-579), indicates that fish and wildlife values will be considered in granting permits for rights-of-way. Conditions to guarantee these values, such as minimum releases from reservoirs to augment instream flows, can be inserted in the permits.

The Corps draft regulations stipulate that the District Engineer, at least every six months, provide the Regional Director of the FWS with information concerning all pre- and post-authorization studies. This information will be helpful to the FWS in making decisions on personnel requirements and preparing investigative schedules. The draft regulations also require the District Engineer to notify the Regional Director of the initiation of any project investigation and coordinate with the FWS throughout the investigation. The District Engineer must consider to the fullest extent practicable the recommendations of the fish and wildlife agencies.

Beginning with FY 1978, funds for the FWCA studies will no longer be budgeted as line items and transferred at the headquarters level. Rather, the District Engineer, after consultation with the FWS Regional Director, will include in his budget the funds necessary for the FWS to comply with the FWCA. The new draft regulations state that local entities must pay for the cost of water released for instream purposes. Also, local entities must furnish assurances that appropriate action will be taken to prevent downstream withdrawals of water that could negate fishery benefits credited to such releases.

In pursuing this strategy, the FWS can seek agency regulations or interagency agreements based on unilaterally adopted procedures, attempt to strengthen present procedures, or see that they are enforced on a project by project basis. If interagency agreements or agency regulations are to be drawn up, or existing procedures made more stringent, the required decision-making would occur at the policy-making level of the FWS, not at the field leve. To enforce the existing procedures, however, decision-making must be at the field level.

In terms of personnel, time and money, the costs involved in implementing this strategy could be quite high. They would vary depending on the tactic that is used. Of the several tactics available, enforcing existing procedural requirements would probably incur the highest cost because it involves project by project application, yet this tactic may carry the greatest payoff

III. Illustration

In 1954, the FWS and Corps of Engineers enacted an interagency agreement to cover the Coordination Act of August 14, 1946 which, when subsequently amended, became the Fish and Wildlife Coordination Act (FWCA) of 1958. This agreement established guidelines for CE consideration of FWS recommendations for fishery preservation in planned water resource projects.

These guidelines stipulated that the District Engineer shall incorporate in a project report all recommendations of the FWS which are satisfactory to him, including, of course, recommended instream flow reservations. The District Engineer must explain in the report his reasons for rejecting those recommendations he found unsatisfactory. Although there is no provision in this interagency agreement for pre-project coordination, the CE is supposed to include fish and wildlife conservation as a project purpose if the effects of a project on fish and wildlife resources would be significant. An Enviro Control study of 10 Corps of Engineer dams in Oregon, revealed that the Corps of Engineers generally accepts the flow requests or provides a modified release schedule.

IV. Evaluation

It is difficult to determine the utility of this overall strategy. It is first necessary to ascertain what effect the Fish and Wildlife Coordination Act of 1958 has had on reserving instream flows. Strengthening the implementation of the Act through the application of the various tactics covered under this strategy could be expected to increase the probability of flow reservations.

A study performed by Enviro Control of instream flow recommendations made in Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Washington and Wyoming indicated that flows recommended in Oregon after the 1958 amendments (FWCA) were accepted slightly more often than prior to that time. The fishery was maintained or improved slightly more often in the post-1958 projects than in the projects built before that time. However, there are no reliable statistics to gauge the success of flow recommendations in the last few years when procedures have become even more stringent.

Although the passage of the Fish and Wildlife Coordination Act of 1958 may have helped to reserve instream flows, making this Act more effective is the goal of this overall strategy. Enacting interagency agreements may be a promising tactic. On the other hand, the CE 1954 agreement is the only one presently operative. Construction and permit agencies probably would be unwilling to draw up such rigorous agreements since their own formalized procedures already contain most of the features in such an agreement. A distinct advantage of interagency agreements, in contrast to unilateral agency procedures, is that the FWS would have more of an opportunity to insert provisions it deems necessary. Also, an interagency agreement may imply more commitment on the part of the cooperating agencies. These characteristics, though, may explain why the Federal construction and permit agencies prefer merely formalizing their own procedures.

The strengthening of present procedures, even to the extent of adopting formal regulations which are more binding, may prove a promising tactic. The National Wildlife Federation has filed a petition in 1977 with the Department of the Interior, Department of the Army, and the Council on Environmental Quality to compel Federal construction and operating agencies to adopt formal procedures in reviewing FWS recommendations for mitigating the adverse impact of development upon fish and wildlife habitats. The petition seeks to alleviate the dependency of the FWS on the construction agencies for transfer funds by having mitigative features funded and implemented concurrently with project construction, or in advance of project construction where there may be interference with the achievement of mitigative goals.

The Wildlife Federation is optimistic that the petitioned agencies will draft formal review procedures. However, the agencies are not expected to fully comply with the petition, but they are expected to take significant steps toward the desired end. For instance, the Corps has drafted new procedures and regulations but they will not be formalized until other petitioned agencies complete their drafts. This petition relies upon existing legislation (FWCA) which avoids the pitfalls of introducing new legislation into Congress.

Another promising tactic is promoting the enforcement of existing procedures and regulations. The construction and license agencies, having issued these requirements, are officially committed to them. Issued by the agencies' main offices in Washington, D.C., these procedures or regulations are not always adhered to in the field. This may be attributed to negligence or mere unfamiliarity on the part of the construction and permit agencies. Also, some FWS Field Offices may be unaware of construction and permit agency procedures.

The major costs involved with the tactics subsumed under this general strategy would result from drafting procedures, regulations or agreements, and attempting to convince the construction or permit agencies to adopt them. The costs, to a large extent, are a function of the cooperation proffered by the agencies solicited.

A major constraint on the effectiveness of this strategy would be the difficulty the FWS would have in determing whether or not the procedural requirements are being honored. FWS knowledge of project planning and development depends on notification by the construction or permit agency. Notification may be delayed until late in the planning phase. Conceivably, the FWS would spend substantial time and effort in trying to be cognizant of project planning programs if it is not properly notified.

Even if proper notification is made, successful implementation of agency procedures for cooperation with fish and wildlife interests is dependent on the availability of funding and personnel. The FWS incurs significant cost when detailed investigations are conducted in the field and subsequent recommendations are formulated for planned projects such as dams and reservoirs. Although the construction agencies transfer funds to the FWS for this purpose, these may not be adequate. Hopefully, this situation may improve, at least as it involves the BR and CE, because of the new funding procedure that the Bureau and Corps will initiate in fiscal year 1978. Transfers of General Investigation funds will be made at the regional level following negotiations of appropriate amounts with the respective FWS Regions. These transfers will be made by memoranda of agreement executed by the affected agency field offices. This new communication at the field level could result in greater funding.

Another constraint upon the effectiveness of this strategy is the lack of an enforcement mechanism. If a field office of a permit or construction agency does not conform with its own procedures or an interagency agreement, the FWS can take no action other than lodging a complaint with the offending agency. The pending adoption of CE regulations is a step in the right direction because the regulations will have the force of law. Concerning the Forest Service and BLM, regulations to be issued in accordance with the Federal Land Policy and Management Act of 1976 (P.L. 94-579) may also afford further protection to fish and wildlife in Oregon.

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FEDERAL LICENSE AND PERMIT STIPULATIONS

I. Identification

The inclusion of a minimum flow stipulation in a dam and reservoir project license or permit ensures that flows will be required to be released as a matter of legal right. To ensure that minimum flows are legally required as an integral part of project operations, it is essential that fish and wildlife interests take an active part in the licensing or permit process involved with an application for use of land and water under Federal ownership or control.

The legal basis for this strategy in relation to Forest Service and BLM-controlled lands derives from the Federal Land Policy and Management Act of 1976 (P.L. 94-579). Conversations with the FS and BLM have pointed out that, until pending regulations are issued pursuant to P.L. 94-579, the permit process for these agencies will continue to maintain vestiges of previous legislation which regulated acquisition of Federal lands. The legal basis with regard to the Federal Energy Regulatory Commission derives from the regulatory authority of the FERC over the non-Federal hydroelectric industry. As a quasi-judicial commission of the Department of Energy, it licenses construction, operation, and maintenance of dam and reservoir projects utilizing waters and lands of the United States under the mandates of the Federal Power Act of 1920 and other Federal laws.

II. Application

This strategy may be utilized when it is determined that a minimum instream flow is needed downstream from a proposed reservoir project requiring a permit or license or subject to relicensing. Participating parties in this strategy would be the Federal agency in control of the affected land and water resources, the project permittee or licensee, and an interested party advocating fish and wildlife interests such as the FWS or the Oregon Department of Fish and Wildlife. In the case of a FERC-regulated project, any person or group of persons whose participation may be in the public interest could participate.

The permit process followed by the Forest Service and BLM are similar. This discussion will focus on this process as it relates to the Forest Service. Presently, the critical point at which fish and wildlife interests may exert pressure for instream flow stipulations in the project permit occurs after the applicant has submitted a plan of construction, operation, and rehabilitation of the proposed right-of-way in National Forests. At this time, an impact survey is performed by the FS which must contain the "views of the Fish and Wildlife Service...and State fish and game departments where fishery and wildlife values are of importance. The Forest Supervisor will ask the Fish and Wildlfie Service and State fish and game departments for a report." At this point the interested fish and game agency should submit its minimum flow recommendations and any studies documenting the efficacy of the suggested flow regime in providing for fish and wildlife habitats.

Upon receiving the plans of the applicant and reviewing the completed impact survey, the FS determines whether the land in question can accommodate the proposed use. If an affirmative determination is made, a permit is granted. Permits normally contain a list of terms and conditions. Section 505 of P.L.

94-579 states that one of the purposes of the terms and conditions is to minimize damage to scenic and aesthetic values and fish and wildlife habitats, and to otherwise protect the environment. Upon granting the permit with accompanying terms and conditions, the applicant must submit detailed plans of construction to the FS. If these plans comply with requirements of the permit, construction may then proceed.

Within this process, it is important that the interested fish and wildlife agency make a specific instream flow recommendation to the Forest Supervisor when asked to comment on potential project impact. Such action will ensure that a minimum instream flow will be considered for inclusion in the final project permit as part of the terms and conditions of project operations.

In the FERC licensing process, there are two critical points at which proponents of this strategy may exert influence. The first point occurs during the applicants' preparation of the Application for License of which Exhibit S is a component. Exhibit S, as described in 18.CFR 4.41, Rules of Practice and Procedure, requires that:

> The Applicant shall prepare this exhibit on the basis of studies made after consultation and in cooperation with the U.S. Fish and Wildlife Service, Department of the Interior and appropriate state fish and wildlife agencies...The exhibit shall include a statement on the nature and extent of applicants' consultation and cooperation with the above agencies.

It is thus essential that fish and wildlife interests make a concerted and organized contribution to this process involving Exhibit S at an early stage in project planning to sensitize the applicant to the importance of instream flow needs and to guarantee coverage of this issue in the application review.

The second point at which fish and wildlife advocates may apply their influence occurs after the Application for License is submitted to the FERC. Upon its receipt, the FERC reviews the application to determine whether or not it fulfills the requirements of the Rules of Practice and Procedure. Public notice of application is then given, specifying a final date for filing protests, notices of intervention or petitions to intervene. Concurrent with this notification copies of the completed application are disseminated to Federal agencies, State agencies and other interested parties for comment and review.

Upon review of the application and determination that instream flow needs are not adequately provided for, an interested party can petition the FERC to intervene in the applicant's licensing. It is essential that such petitions be made before the final date specified by the Commission; otherwise, the petitions may be rejected as "untimely." Section 1.8d of Rules of Practice and Procedure does state that "in extraordinary circumstances for good cause shown, the Commission (may authorize) a late filing." In the event that a petitioner's right to intervene is granted, a hearing is scheduled to resolve the difference. However, prior to the hearing, it often happens that the applicant and the petitioner meet informally and resolve the issue.

Prior to scheduling a hearing, the FERC is also empowered to authorize a Technical Session in which FERC staff meets with the interested party and the applicant in order to clarify the issue, and if possible, resolve it. If resolution is not accomplished in either an informal meeting between the applicant and the intervenor or in the Technical Session, a pre-hearing conference is arranged by the FERC's Office of General Counsel. At this time, the issue is further defined and another attempt is made at resolution. Finally, if the issue is still unresolved, a hearing is scheduled before an Administrative Law Judge of the FERC. Both parties present their case and a decision is made and transmitted to the Commission. This final hearing decision is not binding on the decision of the five-man Commission; however, the decision of the Commission is usually in agreement with hearing findings.

The term of license for most FERC projects is 50 years. The process followed for relicensing of projects is identical to the process discussed previously except that an Exhibit S is not required.

In connection with the Forest Service or BLM permit process, the costs associated with this strategy are limited to those incurred during preparation of the fish and wildlife input to the impact survey. The magnitude of the instream flow study and time associated with preparing the report submitted to the permit agency as part of this input would be the principal cost determinants.

For FERC-licensed projects, the costs linked with this strategy are directly dependent on the extent of agreement between the intervenor and the applicant. Expenditures of time and money increase as negotiations advance through the informal meeting stage to the FERC hearing stage. Occasionally, instream flow studies must be performed to provide data for a decision. The studies are authorized at an informal level or as a result of an FERC hearing. The funding for these studies is normally supplied by the utility company applicant. Most likely the studies would be performed by the Oregon Department of Fish and Wildlife in cooperation with the staff biologist for the utility company.

III. Illustration

The Powerdale Hydroelectric Project (FERC license #2659) of the Pacific Power and Light Company (PP&L) of Portland, Oregon is located on the Hood River, which originates on the north and east slopes of Mount Hood and flows into the Columbia River at River Mile 169. The original project, located on the main stem of the Hood between river mile 1, and river mile 4, was constructed in 1925. The project diverts water through a flume at the dam to a separate powerhouse located about 3 miles downstream and includes a fishway for adult salmonid passage and a screen over the power flume to prevent passage of fingerlings through the turbines.

The original license contained no minimum flow stipulations. PP&L has taken the steps necessary to complete its application for renewal of its license, which expired in 1975; however, the application is still pending. As a result of intervention, in the application for renewal on the part of the Oregon State Game Commission and the Oregon State Fish Commission, now the Oregon Department of Fish and Wildlife, the renewal application contains stipulations of minimum flows for fish and wildlife.

The Hood contains populations of Coho Salmon, fall chinook salmon, and spring chinook salmon as well as both summer and winter steelhead trout. Of these species, spring chinook are the least abundant. Most of the coho and winter and summer steelhead spawn in the upper tributaries, although some spawning by these species has been noted below Powerdale Dam. Most of the fall chinook spawn below Powerdale Dam, with only small numbers passing the dam. In recent years there has been only a remnant run of spring chinook migrating above the dam. Since all fish bound for the Hood River tributaries must pass Powerdale Dam, the area between the dam and the powerhouse is important as a migration route; it is also important as a spawning and rearing area. The area below the dam is also important for steelhead fishing, since 90% of the fishing effort occurs there.

Minimum flow studies accomplished as a result of the joint efforts of the Game Commission, Fish Commission, and the Power Company were completed in 1964 and 1968. These studies were undertaken cooperatively, and , since the draft report states that no special funds or manpower were provided, presumably the cost was borne by the Power Company under FERC regulations. A draft report was written after the 1964 phase; however, changes to the stream channel resulting from the 1964 flood necessitated further study in 1966.

These studies showed that as a result of the diversion of water at Powerdale Dam, the river flow below the dam was much reduced, causing the following potential problems:

- an actual block to upstream migration;
- a delay in migration;
- greater susceptibility of fish to injury and disease;
- greater susceptibility to poaching;
- inducement of fish to spawn in undesirable areas because of low flows;
- significant reduction of rearing capacity in this section of stream and
- trapping of large numbers of fry in small pools as the flow is reduced

Flow as little as 4 cfs had been recorded at the United States Geological Survey (USGS) gage which was located about one-half mile above the powerhouse. Flows often stayed below 40 cfs from July through November. Because the stream bed in this section of river is quite broad and flat the problems created by low flows are accentuated.

Historical flow data prior to 1966 were obtained from the USGS, which maintained a stream gaging station on the right bank of the Hood River about 0.5 miles upstream from PP&L's power plant. That station was destroyed by the 1964-65 winter floods; a new one was eventually constructed above Powerdale Dam; however, no gaging stations were in operation in this section of the river during the 1966 investigations. Therefore, flows were estimated from a staff gage located just below Powerdale Dam installed by the study group. The gage was calibrated by measuring several different flow levels in the river with a Gurley current meter Environmental conditions for fish passage were investigated by comparing measured cross-sectional depths with depth criteria to determine at what flows passage conditions would be adequate.

Data thus gathered led to the following flow recommendations, which were issued by the joint study group and eventually adopted by the Power Company as stipulations in its application. The Game and Fish Commissions concurred in the study group's recommendations, but made their concurrence contingent upon the Power Company's promise to maintain passage for adult salmonids either by creating a channel or by increased releases from the dam, and to install a gaging stations immediately below the dam. The study group's recommendations were as follows:

Revised Flow Recommendations for
Hood River Below Powerdale Dam
(Revised March 2, 1970)

MONTH	Jan-Apr	May-June	July	Aug-Nov	Dec
Streamflow in cfs	270	170	130	100	170
Purpose	Spawning, angling	Spawning, redd protection, shoal rearing, angling	Shoal rearing	Passage rearing, spawning	Angling

In May, 1969, while negotiations were in progress with the Power Company regarding an agreement on these recommended minimum flows, the State Game Commission and the State Fish Commission petitioned to intervene in the Pacific Power and Light Company's license application. Negotiations continued until February, 1971, when the Pacific Power and Light Company submitted the above flow recommendations to the Federal Power Commission now the Federal Energy and and Regulatory Commission, together with proposed modifications of the fish ladder and revised instructions for operating the fish facilities. At that point Game and Fish Commissions withdrew their petition to intervene. Since that time the application has been pending FPC (now FERC) approval. According to a Power Company official, the company does not know when the license will be approved.

Although the license stipulations are not yet official, indications are that the Power Company is complying with them. A source in the Oregon Department of Fish and Wildlife indicated that agency periodically checks on Powerdale Project conditions, though it has no formal monitoring arrangements. As far as the Department of Fish and Wildlife has been able to ascertain, the recommendations are being followed, and the Department is confident that the Power Company will continue to follow them in the future. It must be noted, however, that until the license is granted, there is no official way to enforce the stipulations.

IV. Evaluation

The Powerdale Project illustrates that this strategy has been used successfully in Oregon as applied to FERC projects. It has had limited utility as applied to FS and BLM projects. The Powerdale Project illustrates that resource agencies may use both a cooperative approach-joining in Power Company Studies of fishery conditions-and a coercive approach-intervening in the renewal application-to achieve better conditions.

One constraint on the strategy's effectiveness is the need for specific flow studies. Applicants are understandably wary of accepting instream flow recommendations based on cursory stream investigations, especially, when the guarantee of such flows would increase project costs. Although the licensing or permit processes contain requirements for consideration of instream flow needs, the inability of the interested party to develop realistic recommendations may result in either an omission of instream flow stipulations or inclusion of a clause merely guaranteeing "adequate" or "suitable" flows, a clause which is difficult to enforce. In the case of the Powerdale Project, input from the resource agencies was a specific and integral part of the process, from the time of the initial studies to the time the recommendations were formulated.

Although there is some cost to the State resource agency for participating in flow studies, cost is not a major constraint because the brunt of that cost is borne by the power company. In the case of the Powerdale Project, there were no special expenditures.

More serious constraints are the length of time and the amount of compromise involved in achieving a suitable agreement with the applicant with or without the use of the intervention process. For example, in one recent case in Oregon a power project, which has not been licensed by the FERC, has been operating under a series of temporary licenses while the FERC looks into such matters as economic benefits and safety. The Oregon Department of Fish and Wildlife is prepared to intervene as soon as it receives notice that a formal application is filed. But meanwhile the power project continues to operate without regard to instream flow recommendations. In the case of Powerdale, apparently the Power Company is complying with its stipulations despite the delay in formal FERC approval of its application; however, the delay in granting that license illustrates that delays of various kinds are a constraint on the strategy.

Because the Power Company is complying with the recommendations despite the delay in issuing the license, the Powerdale Project also illustrates another facet of this strategy. Often a project sponsor will agree to supply minimum flows on an informal, non-contractual basis. Such "gentlemen's agreements" have sometimes been responsible for maintaining fisheries below reservoir projects; however, more often than not, the absence of a compelling legal force guaranteeing minimum reservoir releases results in the sponsor's withholding of flows during critical periods of competitive user needs. If the license or permit stipulates flow releases, the licensee or permittee are legally obligated to provide them. Most other instream flow strategies do not lead to as strong a legal obligation.

The future utilization of this strategy will undoubtedly be enhanced as a result of the current research on instream flow needs. Also, further consideration may be given to instream flows in FS and BLM projects with the implementation of the Federal Land Policy and Management Act of 1976 (P.L. 94-579).

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STATE ALLOCATION OF RESERVOIR SPACE

The strategy to obtain reservoir space for fisheries in reservoirs constructed or licensed under State law is not available in Oregon because no statutory or institutional basis exists for its implementation.

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STATE PURCHASE AND LEASE OF WATER RIGHTS

I. Identification

Contractual arrangements to reserve instream flows include the direct purchase of flow rights, the leasing of rights, and the purchase of shares in a mutual water company. The legal basis of this strategy lies in the provisions of Oregon Rev. Stat. 496, which implicitly empowers the Oregon Department of Fish and Wildlife to purchase direct flow rights, to buy shares in a mutual water company, or to lease water for instream use. As the Oregon Water Resources Department presently interprets the State law, a point of diversion is necessary to make the purchased water right valid. Private parties or organizations could purchase shares to acquire instream rights and leave their entitled water in the stream.

II. Application

According to an Oregon Department of Water Resources source no water rights permits may be issued for instream flows in Oregon. Instream flows may be reserved under the minimum stream flow law (see strategy entitled State Appropriation of Instream Flow) but such a reservation is not viewed as a water right, since under the statute, it is subject to administrative review and revision or suspension. There is nothing in Oregon law to prohibit the purchase and transfer of a water right; however, such a right might lose its validity if the water was left in the stream, since diversion is a necessary legal prerequisite to appropriation. The validity of permits transferred for such a purpose would have to be decided on a case-by-case basis. Another difficulty attending purchase and transfer of a water right from a consumptive user to an instream user is the difficulty of enforcing the right even if it should prove to be valid for instream use. No mechanism is included in the law for assuring that water left in the stream under such a permit would not be appropriated by another user for an offstream use and returned to the stream at a point further downstream.

At this time the Department of Fish and Wildlife has no program for purchasing water rights. The Department of Fish and Wildlife could probably also lease water but has no program to do so. This approach provides only an interim solution but may be applied to protect a valuable fishery in a particular stream where no permanent supply of flows is available for purchase. The technique of purchasing shares in a mutual water company is applicable to either private parties or to the Department of Fish and Wildlife. The latter is already a member of an irrigation company in connection with a purchase of wetlands.

A mutual water company is a corporation usually organized by landowners to acquire water for domestic and agricultural use in a designated area. Each shareholder receives a pro rata amount of water based upon the number of shares owned in the company. To apply this strategy, a private party or conservation organization would acquire water rights through a purchase of shares in a mutual company and then not divert their entitled water, leaving it for instream use.

The major cost of implementing this strategy is, of course, the price of water rights which has risen dramatically in the last few years and will probably continue to rise in the future. However, the acquired water right might be sold to be exercised at a point downstream where few instream values worth preserving exist, thereby defraying part of the acquisition cost. Other costs include expenditures of personnel and funds for studies to identify streams where a purchase would have the greatest benefit and the substantial effort to negotiate for the purchase.

III. Illustration

No illustration is available for Oregon; the following illustration from Colorado shows how the strategy might work out. In 1977 the Colroado Division of Wildlife purchased 1 cfs in Boulder Creek above the City of Boulder. It purchased this flow from a private owner for $18,000. The seller was located with the aid of the Nature Conservancy and the Colorado Attorney General's Office.

Although 1 cfs seems to be a small amount of water, this purchase is crucial to preserve the valuable trout fishery in Boulder Creek. The water right purchased is also quite senior, pointing out one of the prime benefits available with this strategy. The importance of this 1 cfs purchase was realized by the Colorado Division of Wildlife while they were studying Boulder Creek as part of their program to implement Senate Bill 97.

IV. Evaluation

Contractual arrangements for the enahncement of instream flows have not been used to a great extent in western states, but could have potential for futre use in Oregon. The principal constraint on this strategy is the requirement for a point of diversion and the vague legal guidelines about whether an instream flow right could be enforced against downstream diversionary users. Another constraint, of course, is the cost of water rights which will continue to rise as more demand is made upon the resources, although if the water could be resold downstream, acquisition cost be reduced.

When no flow rights are available for sale, then the Oregon Department of Fish and Wildlife might be authorized to lease water for instream use. In addition to the constraints outlined for direct purchase, leasing arrangement incur the following constraints:

- Leasing presents only an interim solution
- Leases may be subject to conditions which are expedient for the vested claimant rather than the lessee.

When no private rights are available either for leasing or purchase, then a purchase of shares in a mutual water company may be advantageous. This purchase might be made by a private individual or organization or by the Department. Besides the cost constraint, other problems would arise in applying this approach. First, there is some question as to whether a mutual water company's shares can be used for instream purposes. Second, such a use would probably meet intense hostility from diversionary users.

Despite the constraints upon the strategy of employing contractual arrangements to enhance instream flows, this strategy is very promising. It provides a very direct way to legally protect instream flows. Also, it provides an opportunity to acquire senior water rights, an increasingly important factor in a state where many streams are fully or overly appropriated.

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WATER RESOURCE PLANNING

FEDERAL WATER RESOURCES COUNCIL PLANNING PROGRAMS.

I. Identification

Coordination of Water Resources Council (WRC) planning activities performed by a River Basin Commission (RBC) with the planning activities of the member States of the Commission will allow for increased emphasis on instream flow needs on national, regional, and State levels. The planning process of the WRC derives from the Water Resources Planning Act of 1965 (Public Law 89-80), which was designed to encourage conservation, development, and use of the nation's water and related land resources on a comprehensive and coordinated basis by Federal, state, and local governments and private enterprise. The Act established the Water Resources Council (Title I), provided for the establishment of River Basin Commission (Title II), and authorized financial assistance to States for comprehensive water and related land resources planning (Title III). So-called Level B studies were authorized by Section 209 of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500). Under this legislation, the WRC was directed to prepare Level B Plans for all river basins of the United States.

II. Application

Level B studies are designed to resolve complex problems requiring interdisciplinary approaches and interagency inputs. These studies vary widely in scope and detail, focus on middle-term needs (15-25 years), and involve Federal, state, and local interests. The findings of these studies are an integral part of the "Comprehensive, Coordinated, Joint Plans" (CCJP's) prepared by the various RBC's. The subject matter of these studies includes energy issues, water quality, land use, and other water-related topics such as maintaining instream flows for fish and wildlife.

Just as the RBC is responsible for preparing a CCJP at the regional level, so too an agency of the Oregon State government is responsible for preparing or revising Comprehensive State Water Plans governing future water policy decisions.

A major cost to the state for participation in a Level B planning effort is the WRC requirement that the State bear 25% of the total funding cost. The state may supply its share of the cost in the form of in-kind services such as office space and equipment or project support staff. Additional costs are incurred by agencies who participate in the planning process and who fund the Fish and Wildlife Department's determination of instream flow requirements. The level of Federal funding received by the state fish and game agency is based upon negotiations between the fish and game agency, the FWS, and the River Basin Commission.

III. Illustration

Although several Level B studies have been done in Oregon, none have been implemented primarily because State water planning efforts, which antedated the authorization of Level B Studies, have been so successful. Beginnning in 1955, State comprehensive water plans for eighteen basins were developed under the old Water Resources Board. Some of the older plans were brief, if not perfunctory. For example, the original plan for the Umpqua Basin, completed in 1958, had seven points of measurement for minimum flows on six streams in the watershed. In general the recommendations equalled the lowest recorded flow. In more recent times, however, these State plans are being reviewed and brought up to date with the help of biological data compiled by fish and wildlife interests. The Water Resources Board reviewed the Umpqua determination in 1974 and adopted some of the minimum flow recommendations of the Department of Fish and Wildlife.

Though Oregon's participation in Level B planning is small in comparison with its efforts in State water-use planning, some Federal planning has occurred. Thus, this strategy is illustrated in Oregon by the Type II Comprehensive study, completed for the Willamette Basin by the Willamette Basin Task Force of the Pacific Northwest River Basins Commission in 1969. The Type II study was a presursor of the Level B study and was authorized under an earlier law. The study area contains thousands of miles of streams, hundreds of mountain lakes and dozens of reservoirs. Nearly all these waters furnish sport fishing for coldwater species of fish. Warmwater game fish are found in the Willamette, the lower reaches of many tributary streams, many low-elevation lakes and ponds, and several of the large flood control reservoirs. Fishes of the basin include the following groups: Anadromous fish - including salmon, steelhead and searun cuttroat trout, eulachon, and American shad; cold-water game fish - the trouts, kokanee, white sturgeon,and mountain whitefish; warmwater game fish - the bass, catfish and panfish of the basin; and nongame fish. Both anadromous and resident races of rainbow trout (steelhead), cutthroat trout (searun cutthroat) and sockeye (Kokanee) occur in the basin.

Approximately 11,200 square miles are drained by the Willamette River, which enters the Columbia near Portland. Average river discharge, recorded by the U.S. Geological Survey's Wilsonville gage at river mile 38.5 from September 1948 to October 1965, was 29,400 cubic feet per second. Extremes during this interval were 3,600 cfs in November 1952 and 339,000 cfs in December 1964. Flow sizes affect the supply of spawning and rearing gravel as well as conditions such as water temperature and water quality, which in turn affect fish populations. Dams on the stream reaches prevent upstream migration of adult anadromous species in some places and kill juveniles migrating downstream in others.

The Type II Study divided the Basin into eleven subbasins. The study report included both the minimum streamflow stipulations for each subbasin which had been set by the Oregon State Water Resources Board, and the more detailed and comprehensive recommendations of the Oregon State Game Commission.

The natural flows stipulated are subject to all water rights in force prior to June 22, 1964. In some cases, the natural flows stipulated are greater than the natural flows of record. The storage flows stipulated are not guaranteed. The Corps of Engineers is not required, and in some cases may not be permitted, to furnish the flows as they are needed.

The Game Commission's recommendations differed from these chiefly in that they contained many more stream gage locations and detailed the seasonal flow variations. Most of the existing check points are on the main stream. Thus, though streamflows on the main stream are likely to be maintained, tributary streams often suffer from low flows. These tributaries are important for fisheries such as steelhead, cutthroat trout, and some Chinook salmon. Though the more stringent recommendations of the Game Commission had already been considered and rejected by the State Water Resources Board, some Game Commission staff believed that including them in the published Type II study report would be useful, in that they might be used to guide future revisions of the State plan. Department of Fish and Wildlife sources could not say whether the Type II study had any effect on the thinking of the State Water Resources Board, but to date the State plan has not been revised, nor is there any indication that such revision is contemplated.

IV. Evaluation

In the opinion of Oregon Fish and Wildlife officials, Level B studies are of limited use as actual influences on State water policy since they are of no particular help in getting Fish and Wildlife Department recommendations of minimum flows adopted by State water policy makers. The Beneficial Water Use Program for the Willamette Basin was completed prior to the Comprehensive Type II study of 1969. Many of the streamflow recommendations made by the Fish and Wildlife Department were rejected by the then Water Resources Board.

The use made of Type II and Level B studies depends to a large extent on the scope and purpose of the studies themselves. Though the CCJP's are comprehensive in nature, studies are likely to be tied to a specific water development project. Given the Oregon minimum streamflow law and the State administrative procedures for setting water policy, Level B plans are not likely to be good vehicles for instream flow recommendations; there is a more direct route through the Water Policy Review Board. It should be noted, however, that though such studies may not be used by the State, they may be consulted by the Corps of Engineers.

Level B studies may yet prove to be beneficial in reserving instream flows even though they are not the most direct route. Construction agencies such as the CE use these studies to justify the reauthorization of their projects. The mere inclusion of minimum streamflow recommendations in such studies is helpful to fish and wildlife interests. Even if the CE does not adopt the recommendations, fish and wildlife needs will be considered and studied during the reauthorization process. The Type II or Level B study recommendations could lead to to a follow-up study in which new recommendations can be made.

This strategy provides a means for the study of instream flow needs rather than reserving these flows as part of dam and reservoir project operations. Therefore, it must be used in conjunction with other strategies which can directly achieve flow reservations. Nevertheless, the national and regional exposure accorded to flow requirements as part of the WRC planning program increases the overall viability of instream flow reservations.

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FEDERAL AID FUNDING TO PURCHASE STORAGE

I. Identification

The Federal Aid in Fish and Wildlife Restoration Programs are supported by a manufacturer's excise tax on certain items of fishing gear, sporting arms and ammunition. These taxes collected by the United States Treasurer are appropriated to the Fish and Wildlife Service which distributes these monies to the states and territories for carrying out the intent of the Federal Aid Programs. Under the Federal Aid in Sport Fish Restoration Act (P.L. 81-681), known as the Dingell-Johnson Act, funds may be appropriated to the states for the purchase of reservoir storage which, ultimately, could be used as a means of reserving instream flows. Other legislation, which combined with the Dingell-Johnson Act, forms the legal basis for Federal Aid Programs, includes the Federal Aid in Wildlife Restoration Act, known as the Pitman-Robertson Act (P.L. 75-415), and the Anadromous Fish Conservation Act (P.L. 89-304).

II. Application

This strategy may be utilized when the Oregon Department of Fish and Wildlife determines that the fish and wildlife resources below a reservoir might not be preserved or enhanced except by the purchase of reservoir storage. Parties participating in the implementation of this strategy would be the interested state fish and game agency and the regional FWS Federal Aid office.

The process whereby a state applies for Federal Aid funding is described in the 1973 revision of the Federal Aid Manual. The first document submitted by the state is the Application for Federal Assistance (AFA), which outlines the basic plan for the proposed project. Information pertinent to the environmental and socio-economic impacts of the project as well as budget information and forecasted cash needs are also included in this application. The most important part of the application is the Program Narrative which must address:

- Needs or objectives of the project
- Expected benefits or results
- Approach of the project
- Project location
- Related Federal projects.

The AFA in combination with any supporting documents provides the basis for any decision made by the Federal Aid office. If the proposed project is in accordance with specifications of the Federal Aid Program, a Project Agreement is issued. The Project Agreement outlines the period of agreement between the state and the U.S. government and the respective cost share of each entity during the period of development. In Oregon, the State Legislature must approve the purposes for which the State expends funds. Care must be taken that matching funds come from State sources; a project cannot be approved if it depends upon another Federal program for its matching funds.

Costs are incurred by the State and Federal governments in the implementation of this strategy. Prior to submitting an AFA, the State must expend funds to determine which streams are in need of increased flows. Additional costs are borne by the State in revising AFA's which the Federal Aid office determines to be incomplete or insufficiently detailed.

III. Illustration

Though Federal Aid monies have been used to construct or rebuild reservoirs and to purchase minimum pools for resident fish in western states, they have not yet been used in Oregon to purchase reservoir storage for instream flows, so an example from Utah is cited here to illustrate the utility of this strategy. Long Park Reservoir Project, operated by the Sheep Creek Irrigation Company, will be located on Sheep Creek in the Ashley National Forest within Dagget County, Utah. Sheep Creek is a feeder of Flaming Gorge Reservoir operated by the Bureau of Reclamation. A clearing permit was secured from the Forest Service and elimination of trees from the reservoir site was completed in the spring of 1977. Construction of the reservoir will begin in October 1977 with an estimated completion date of October 1978. At the present time, the Sheep Creek Irrigation Company acquires water from four high-mountain impoundments--Dagget, Tamarack, Jesson and Spirit Creek between the site of the proposed Long Park Reservoir and the backwater of Flaming Gorge Reservoir.

In its upper and middle reaches, Sheep Creek is a narrow stream located in a constricted canyon. In its lowermost three miles, Sheep Creek Canyon expands in its course toward Flaming Gorge Reservoir. This reach sustains the spawning of rainbow and brown trout which emerge from the reservoir in the months of April (rainbow) and October and November (brown). In past years, to secure adequate storage for irrigation needs, the operating schedules of the four high-mountain reservoirs stipulated that flows would not be passed in Sheep Creek during the months of spring run-off storage or during the fall non-irrigation months. Therefore, the spawning of rainbow and brown trout was hindered in the lower 3 to 4 miles of Sheep Creek.

In 1974, the Utah Division of Wildlife Resources (DWR) was notified that planning had been undertaken by the Sheep Creek Irrigation Division and the Soil Conservation Service for the proposed 13,700 acre-foot Long Park Reservoir. On June 14, 1976, the DWR submitted an AFA to the Fish and Wildlife Service. In the Narrative Statement of this application, the DWR made the following proposals:

- Purchase three of the four high-mountain lakes from the irrigation company so that these impoundments could be stabilized

- Purchase a 3,000 acre-foot conservation pool to maintain a trout fishery in the new reservoir

- Purchase 720 acre-feet of water which could be bypassed at the Long Park Reservoir Diversion Dam to enhance the fishery habitat in the lower four miles of Sheep Creek.

According to the agreement between Sheep Creek Irrigation Company and the Division of Wildlife Resources, no water will be diverted from Sheep Creek between December 1 and March 31; however, from the 720 acre-feet of active storage acquired, 4 cfs will be bypassed each Spring from the Lower Sheep Creek Diversion Dam for the first 30 days after water from Sheep Creek is diverted to Long Park Reservoir, and 4 cfs will bypass this diversion dam between October 1 and December 1. These releases are intended to enhance the spawning habitat of Lower Sheep Creek. The DWR has also reported that if these flows result in improved spawning, channel improvement and riparian revegetation will be carried out in this reach.

On June 30, 1976, the FWS issued a Project Agreement wherein funding in the amount of 75% of project costs or $272,790 was supplied to the DWR for the Long Park Reservoir Project. These funds were to be administered in accordance with the Federal Aid in Sport Fish Restoration Act and used for the purchase of water rights in the three high-mountain lakes and Long Park Reservoir and to provide for bypass flows at the diversion to Long Park Reservoir.

As indicated by the two-week "turn-around" time between DWR's submission of the AFA and the issuance of an FWS Project Agreement, an AFA thoroughly prepared in accordance with Federal Aid Manual instructions will ensure timely processing of an pplication. The critical points in the decisionmaking process for this strategy are to be found during the State's preparation of the AFA. The successful acquisition of Federal Aid funding is dependent upon:

- Sufficient documentation of the AFA for the proposed project
- Adequate performance in Federal Aid-funded projects which are in progress.

In the case of Long Park Reservoir, the major cost incurred by the State was the 25% share ($90,930) of project costs.

IV. Evaluation

Although not yet implemented in Oregon, this strategy has significant potential. For a recent two-year period, Oregon Federal Aid budgeted approximately $15,000,000, excluding State matching funds. Substantial water rights could be purchased using only a modest share of this money. The primary obstacle to using Federal Aid funds for this purpose is gaining the approval of the State Legislature.

If this strategy is to be successful, Oregon must avoid mistakes other states have made which have curtailed its effectiveness. Conversations with officials of the Federal Aid Program indicate that, in the past, delays in project funding have resulted from inadequate documentation of Project Agreements. These agreements between the state and the affected irrigation districts were often vague in delineating post-project responsibilities. Failure by the state to submit reports and vouchers for the previous year's work within the 90-day period specified by Federal Management Circular 74-7 also delayed the processing of an AFA for impending work.

Another impediment to the use of the strategy has been state violation of the Rules and Regulations of the Federal Aid Program (Section 80.5).

States become ineligible for Federal Aid funding if funds or real property acquired through this source pass from control of the state fish and game agency or are used for purposes not specified in the Project Agreement. state eligibility is restored when misused funding is compensated or the appropriated property or an equivalent is restored. If Oregon adheres to the administrative guidelines of the Federal Aid Programs, this strategy's effectiveness will increase in the future. Other than these administrative obstacles, there are no institutional or legal impediments to the successful implementation of the strategy if adequate state funding can be achieved.

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FEDERAL RESERVOIR CONSTRUCTION AND ENLARGEMENT

I. Identification

This strategy involves the construction of new dams and reservoirs large enough in capacity to expressly provide for instream flow reservations, or the enlargement of existing dams and reservoirs for this purpose. The legal basis for this strategy is implied in the legislation granting authority to construction agencies to construct and modify reservoir projects. The Bureau of Reclamation derives this power from the Reclamation Act of 1902 and subsequent amendments, especially the important 1939 amendments. The Corps of Engineers is granted construction authority by the various Rivers and Harbor Acts, and the Soil Conservation Service operates under the Small Watershed Protection Act. More specific statutory authority to provide reservoir storage capacity expressly for regulation of streamflow for fish and wildlife needs is contained in Section 102 of the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500).

The Anadromous Fish Conservation Act authorizes the Bureau, Corps, Department of Agriculture, and the states to construct dams and reservoirs solely for the purpose of conserving, protecting, and enhancing anadromous fish if the Secretary of Interior deems this action necessary. The Fish and Wildlife Coordination Act provides a mechanism through which the Fish and Wildlife Service and State fish and game agencies can implement this strategy.

II. Application

This strategy would be applied when construction agencies first begin planning to construct a new dam or enlarge an existing one. No Federal construction agency, except under the Anadromous Fish Conservation Act, is authorized to build a reservoir solely for fish and wildlife purposes; however, the protection or enhancement of fish and wildlife resources could be made a very important project purpose in a multi-purpose project. The FWS and the Oregon Department of Fish and Wildlife could promote fish and wildlife conservation to the extent that additional storage capacity specifically to sustain and reserve minimum instream flows would be planned. If during initial project planning these agencies learn that planned storage volumes will be insufficient to provide adequate instream flows, they may recommend a large dam and reservoir and have the additional costs allocated to fish and wildlife benefits.

When construction agencies enlarge existing reservoir projects, they may do so solely for fish and wildlife purposes or for a number of reasons including the preservation or development of fish and wildlife resources. The fish and game agencies would have to convince the construction agencies of the advisability of enlarging a reservoir to ensure reserving instream flows. Relating a minimum flow regime to the storage capacity necessary to its maintenance may require hydrological data and expertise that is difficult for fish and game interests to acquire. Also, fish and wildlife agencies must convince the construction agencies of the economic benefits of this action. The construction agencies are an important beneficiary of this strategy because they can claim valuable economic benefits in constructing larger dams or enlarging dams for fish and wildlife purposes, possibly improving the economic justification of a reservoir project. Marshalling public opinion can be an important component of this strategy. The FWS and the Oregon Department of Fish and Wildlife can cooperate with conservation organizations and sportsmen's clubs in their negotiations with the construction agencies.

In implementing this strategy, the fish and game agencies must decide which proposed or existing reservoir projects they should investigate for which instream flow and which related storage recommendations are most needed. This decision is predicated on the importance of protecting a particular ecological resource and the likelihood that construction agencies will accept and implement the recommendations. The decision making involved is related to the application of other instream flow strategies (see strategies entitled State-Federal Flow Requests Made Early, State-Federal Combined Storage and Flow Requests, and State-Federal Interagency Consultations). The implementation of this strategy also depends on decision making by Congress which must authorize the construction or enlargement of dams and reservoirs.

Because of State administrative structure,the resource agency which seeks to implement this strategy in Oregon must obtain three things: approval of their requests for instream flows and reservoir storage allocations from the Federal Construction Agency; designation of a corresponding minimum stream flows from the State Water Policy Review Board, and water permits from the State Department of Water Resources.

The total costs could be substantial in implementing this strategy. Costs woudl be incurred in conducting stream investigations to justify the inclusion of flow reservations. In addition, however, developing th hydrological basis for increasing the reservoir capacity to sustain the flow reservation will impose signficant study cost.

III. Illustration

The Rogue Basin projects of the Corps of Engineers illustrate the implementation of this strategy. The Rogue River Subbasin is one of three subbasins of the Oregon Coast Basin, which includes all streams south of the Columbia River which drain into the Pacific Ocean. The Rogue projects, three multipurpose reservoirs, are the first in Oregon to have fish and wildlife enhancement, water quality control, and recreation as authorized primary purposes. The project was authorized in 1962. The first of the three dams, Lost Creek Dam, was completed in late 1976 and closed in early 1977; two other dams in the project, authorized at the same time, are now in planning stages.

The Rogue River originates in the interior Cascade Range; it flow westerly to the Pacific Ocean. In places the river churns through rock gorges with nearly vertical walls; in others it meanders through agricultural and rural residential developments, but for the most part it is swift and steeply graded, characterized by widely varying scenery, superb whitewater, and excellent fishing. A segment of the Rogue has been designated under the National Wild and Scenic Rivers Act; the river is also protected under the Oregon Scenic Waterways Act. A section flows through the Siskiyou National Forest.

The Rogue supports important fish and wildlife populations. Its fishery contains several important species. Coldwater species include salmonids, winter and summer steelhead, spring chinook, fall chinook, coho salmon, and resident trout. Various warmwater species live further upstream in a wetland habitat resulting from sediment fill behind an old power company dam now part of a park operated by Jackson County. This wetlands habitat also supports a large heron rookery. Despite disadvantages for the coldwater fishery, the Oregon Department of Fish and Wildlife supports retaining this dam in the system because of the advantages for wildlife. Fourteen wildlife habitat types are present in the Rogue River Canyon including grasslands, coniferous forest, brush fields, burns, and streamside vegetation. There are wildlife populations of Blacktail deer, Roosevelt elk, black bear, cougar, small fur bearing animals, and game and migratory birds.

During the winter and spring months most streams in the Rogue Basin have an abundance of water. In summer and fall, however, flows decrease to critical levels. This period of natural low flows is also the period of largest consumptive demand for water. Diversions reduce spawning and rearing areas in the tributaries, which affects angling in the corridor. During the summer low flows, water temperatures as high as 80° F have been reached at Mule Creek and Grant's Pass. These temperatures are beyond the tolerance levels of salmonids and cause increased incidence of disease, restricted movement, increased concentrations, and ultimately, fish mortality. Water quality problems also occur during the summer months, when flow is insufficient to dilute pollutant concentrations in return irrigation flows, and localized wastes in upper tributary streams.

The design of the three Rouge impoundments, Lost Creek, Applegate, and Elk Creek, includes provisions to improve minimum flows, lower water temperature, and improve water quality. A portion of the storage capacities of these dams was planned and justified on the basis of fishery protection and pollutant abatement. The cost benefit ratio for the project, based on a 100-year period of analysis, was 1.0 to 1.5; much of this benefit was due to the value of the fishery.

As a condition to construction and operation of these projects, Congress specified in Public Law 87-874 that the CE and the State of Oregon give assurance that flows to enhance the fish resources would be maintained in the stream. In order to comply with this condition the then Oregon Game Commission together with the Fish Commission, applied to the Oregon State Engineer for rights for flows and storage. The flow regimens applied for were developed by these State agencies and the FWS and then presented to Congress. The amount of storage originally filed on for Lost Creek Reservoir was 125,000 acre-feet, the average annual amount shown by then-current studies. This amount was to be required to be released to supplement natural flows.

This amount probably would have been enough to give the assurances Congress required; however in 1965, while the project was still in the early planning stages, members of the Game Commission staff were able to convince the Corps that a higher degree of protection for the fish enhancement function of the project was desirable and that such storage could also help protect the other authorized project functions of irrigation, water supply, and water quality control. Hence, the Corps requested that the Water Resources Board modify its minimum stream flow program for the Rogue to protect a higher level of natural flows. The Board had set minimum flows of 1000 cfs at the Raygold and Savage Rapid Dams and 735 cfs at the River's mouth in 1963. In 1966 these were raised to 1200 cfs at the dams and 935 cfs at the mouth. At the same time, the State Game and Fish Commissions filed with the State Engineer for an additional 100,000 acre-feet of storage in Lost Creek Reservoir. The increased storage amount was based on a study which showed amounts of stored water which would have been needed for each year of a 31-year period similar to the period 1929-1959. The results of that study showed that in four of the 31 years amounts in excess of 200,000 acre-feet would have been required. The amount of 225,000 acre-feet was arrived at in order to plan for the possibility of a year with even more severe conditions.

OUt of a total of 465,000 acre-feet, the fish and wildlife allocation is 225,000 acre-feet, 125,000 acre-feet from annual storage and 100,000 acre-feet from carryover storage. At first glance this appears to be a fish and wildlife coup. In practice, however, this allocation may be reduced. The Corps of Engineers originally planned to build the Lost Creek Project together with the Elk Creek Projects. Because of difference in water quality, water for downstream flow improvement was to come from Lost Creek Reservoir, while water for irrigation, industrial, and municipal use was to come from Elk Creek Reservoir. However, the Elk Creek Project has been shelved at the request of the State of Oregon, thus if a water shortage should occur, demands for irrigation, industrial, and municipal uses might have to be filled from Lost Creek Reservoir. In such an event the storage will be divided pro rata, in the same proportions as total storage. It is thus possible that the 225,000 acre-feet might be reduced to 195,000 acre-feet during short water years.

Seasonally varying releases of from 700 cfs to 200 cfs are to be made annually from the 225,000 acre-feet of storage allocated to the fishery. Forest Service sources indicate that during the 1977 summer season flows of up to 900 cfs were released -- 150 cfs more than was coming into the dam.

Over a ten year period, the Department of Fish and Wildlife conducted studies which resulted in storage in the Lost Creek Reservoir for fish and wildlife. The Department estimates that it devoted one-person year to obtaining this storage allocation.

IV. Evaluation

To the present, no reservoir west of the Mississippi River has been built solely for fishery purposes under the Anadromous Fish Conservation Act. Federal construction agencies, though, can include fish and wildlife conservation as a project purpose and can provide substantial reservoir storage to sustain flow releases so as to further this purpose. This approach has been more common in recent years, partially because the construction agencies can maximize their benefit claims by adding to the project purposes, and because of recent environmental legislation and increased environmental consciousness.

In the case of the Rogue Basin projects, the value of the river as a recreational and scenic resource was apparent, and the value of the fishery well known. Because the Corps needed the additional benefits provided by these resources to justify its contruction, Fish and Wildlife recommendations were sought and heeded. The result was not only substantial releases but also a large percentage of storage allocated to fish and wildlife.

To successfully implement this strategy, the FWS and the Oregon Department of Fish and Wildlife must participate early in the planning process with the construction agency and fully understand the allocation of projected reservoir storage. A basis for coordination with construction agencies is provided by the Fish and Wildlife Coordination Act (see strategies entitled State-Federal Combined Storage and Flow Requests, State-Federal Flow Requests Made Early, and State-Federal Interagency Consultations). Although the construction agencies are under no legal or institutional compulsion to adopt the course of action advocated by the fish and game interests, conservation agencies and their private-sector allies are sometimes convincing in bargaining for greater reservoir storage capacity to ensure reserving instream flows. Their persuasiveness depends a good deal on the scope of their knowledge of the hydrological and biological conditions surrounding a planned or existing dam and reservoir projects.

Once a construction agency commits itself to build a new dam or enlarge an existing one for purposes including the reservation of instream flows, such a commitment is embodied in authorizing legislation passed by Congress. This legislative action is a primary advantage of this strategy because it has the force of law and expresses Congressional intent to protect instream flows. Such a Congressional mandate was of value in getting both Federal and State action or recommended minimum flow reservations for the Rogue.

WATER RESOURCE MANAGEMENT

STATE WATER RIGHTS RECORDS ANALYZED

I. Identification

This strategy involves locating and analyzing the water rights records for a particular stream as part of the process for securing instream flows. The strategy itself will not ensure an instream flow, but it can be used by the Fish and Wildlife Service and by the Oregon Department of Fish and Wildlife in formulating tactics when negotiating with construction or operating agencies for minimum instream flows. Any interested party could find this strategy useful in deciding what tactics or further strategy would be appropriate to obtain instream flows in a particular stream.

The legal basis of this strategy under State law is the State Water Code (Oreg. Rev. Stat. Chapter 536-543) which provides for the keeping of water rights records. Negotiations between the FWS and Oregon Department of Fish and Wildlife and the Federal construction agencies take place in accordance with the Fish and Wildlife Coordination Act. These statutes are the legal basis of this strategy.

II. Application

The Oregon Department of Fish and Wildlife, the FWS, or any conservation organization can employ this strategy. It is applicable when a concerned party seeks to convince the Water Policy Review Board to establish or to increase a minimum instream flow under the Oregon Minimum Streamflow Law, when a concerned party seeks to obtain a State water permit for stored water to be released for instream flow purposes, when the Oregon Department of Fish and Wildlife negotiates for permit stipulations with permit applicants, and when either the Oregon Department of Fish and Wildlife or the FWS is bargaining with a Federal construction or operating agency for reservoir releases sufficient to maintain instream flows already prescribed.

Knowledge of the water rights established along a stream reach will aid in selecting the best course of action to reserve instream flows there. For example, if normal streamflows are fully appropriated, a strategy such as obtaining a junior minimum streamflow ruling would not be effective, but a strategy such as direct purchase of water rights would be. In contrast, if a stream is not entirely appropriated, an administrative appropriation of instream flow under the Minimum Streamflow Law may be applicable.

The Oregon Department of Fish and Wildlife or the FWS can bargain more intelligently with the construction or operating agency for prescribed releases from a reservoir if the extent, location and ownership of water rights established below the dam are known. For instance, if the fishery in a certain stream reach required a minimum 15 cfs instream flow, then sufficient reservoir releases should be prescribed so that 15 cfs will remain after all superior water rights throughout the stream reach have been exercised. Therefore, knowledge of the existing water rights is essential. With this knowledge, a fish and game agency could tie an instream flow recommendation to an existing downstream water right. This bargaining tactic may be useful as a last resort where protection of fish and wildlife is not possible by other means, e.g., where the stream is too small to have had a minimum stream flow designated.

All water records in Oregon are a matter of public record. Records for the entire state are stored at the Salem office of the Oregon Department of Water Resources. In addition, records for each Water District are stored at the office of the District Water Master. The records are complete: for every stream in the State, a private individual, organization, the Department of Fish and Wildlife, or the FWS can ascertain the amount, the point of diversion, the date of priority, and the name of the original owner of the right, that is the person to whom the Water Right Certificate was issued when the right was finalized. For the names of subsequent owners, a search of the land records in the local county recorder's office is necessary.

The Oregon Department of Water Resources has a current Federal grant to study the feasibility of a computer data system which would store water rights records; a part of this system may store records for the entire Columbia River Basin. The Department of Water Resources hopes to get the data system into the next biennial budget, for implementation in 1979-1981. The cost of this strategy is minimal. The main cost is time of personnel to check the records. This cost will be cut if the computer data system is approved. Currently a copying fee of $1 for the first page and 25¢ for each subsequent page is charged.

III. Illustration

Knowledge of a downstream water right enabled the Oregon Field and Game Commission, now the Oregon Department of Fish and Wildlife, to obtain a stipulation for a minimum flow from the owner of a private diversion dam on a small stream. Without the downstream right, the permit applicant probably would not have agreed to the stipulation. The Slick Rock Project is located about two miles southeast of Rose Lodge, Lincoln County, Oregon, on Slick Rock Creek, which flows into Trout Creek, which, inturn, joins the Salmon River. The terrain in the project area is mountainous; land uses are forestry, grazing, and some residential development.

Prior to the construction of the project, Slick Rock Creek was a shallow stream, varying in width from 15 to 25 feet, flowing through a narrow canyon. Large boulders in the streambed created pools four feet in depth. The Creek's fishery contained native trout and some salmonid species. Small numbers of fall and spring chinook salmon, coho salmon, cutthroat trout, and summer and winter steelhead used the stream for passage, spawning, and rearing habitat. Some small furbearers existed in the project area.

The Slick Rock Project Water Diversion is owned and operated for domestic purposes by C. Dave Davis. Water is diverted from Slick Rock Creek by way of a covered infiltration system constructed diagonally to the stream. C. Dave Davis applied to the Office of the State Engineer in 1972 for a permit appropriate .05 cfs of water from Slick Rock Creek.

The Oregon Fish Commission recommended a minimum flow of 8 cfs for the three-mile stream reach from the dam to the Creek mouth. This recommendation was based on field observations and the environmental needs of salmon and steelhead. Mr. Davis disagreed with the recommended flow but agreed to a stipulation for 4 cfs based on a downstream municipal water right for that amount. This stipulation became a part of his permit.

Subsequent streamflow measurements have been too infrequent to be accurate; however, measurements by the State Engineer subsequent to the project indicated a flow from July to October ranging from 7 to 34 cfs. Observations by a Department of Fish and Wildlife biologist put the summer-fall flow at 10 to 20 cfs and the winter flow at 20 - 40 cfs. Post project conditions in the fishery are similar to those which existed before the project; however, studies conducted from April to September, 1975, did not indicate the presence of salmon and steelhead, which had occurred in the stream prior to the project.

IV. Evalution

Although this strategy has displayed some utility in the past, fish and wildlife interests have only infrequently applied a knowledge of water rights to help ensure instream flows. Sources in the Oregon Department of Fish and Wildlife indicate that they usually depend on the Water Resources Department for such information and do not conduct their own record searches. Further, neither the FWS not the Oregon Department of Fish and Wildlife systematically analyze all water rights on a particular stream reach when bargaining for reservoir releases. In a few instances, the FWS and/or the Oregon Department of Fish and Wildlife has applied some knowledge of downstream water rights as a bargaining tactic as in the Slick Rock project.

It can be argued that flows would be released from a reservoir to satisfy downstream rights regardless of an agreement between the FWS and Federal construction, operating or permit agency. However, it is advantageous to obtain a formal agreement because the downstream rights eventually might be reduced or terminated. An obvious disadvantage of this tactic, though, is that the flow released to satisfy downstream rights may not be the optimum flow for fish and wildlife purposes.

This strategy is ineffective if used by itself. A knowledge of the water rights situation along a certain stream will not result in an instream flow reservation unless this knowledge is used in conjunction with another strategy. An advantage of this strategy in Oregon as compared to some other states is the availability and comprehensiveness of water rights records. Moreover, the use of this strategy is not limited to a particular agency, it is applicable to every stream in Oregon at nominal cost.

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STATE-FEDERAL FLOW REQUESTS MADE EARLY

I. Identification

To offer timely flow recommendations, the Fish and Wildlife Service and the Oregon Department of Fish and Wildlife must be involved in the planning process when Federal agencies, such as the Corps of Engineers, Bureau of Reclamation, and Soil Conservation Service, plan the construction of dams and reservoirs. Recommendations that are timely, i.e., made prior to protect construction, have a greater chance of acceptance and implementation than those made during or after construction. The legal basis of this strategy is the Fish and Wildlife Coordination Act of 1958 and the planning procedures adopted by the Federal construction agencies.

II. Application

This strategy is applicable when any Federal construction agency is planning a reservoir, particularly in the earlier phases of planning before design and cost options are foreclosed. Also, when the Federal Energy Regulatory Commission is considering licensing or relicensing a dam and reservoir project, or when the Bureau of Land Management or Forest Service is in the process of issuing a permit to construct a dam on Federal lands, this strategy would apply. The role of these agencies, however, is treated separately (see strategy entitled Federal License and Permit Stipulations). The Bureau of Indian Affairs manages reservoirs, but reservoirs under its management are constructed by the BR.

As provided by the Fish and Wildlife Coordination Act of 1958, the FWS and the Oregon Department of Fish and Wildlife would pursue this strategy. Although it would not be available directly to private parties or public interest organizations, they could play an important role in exerting pressure on the construction agency to accept the fish and wildlife agencies' recommendations.

To apply the strategy, the fish and game agencies must a conduct a timely investigation to formulate instream flow recommendations. Application of the strategy is contingent upon prompt notification by the construction agencies of the initiation of project planning. Each construction agency has promulgated procedures to provide for early notification and cooperation with the FWS and the Oregon Department of Fish and Wildlife.

A recent letter from the Commissioner of the BR to the Bureau's Regional Directors ordered them to notify the FWS of the initiation of project planning, and provide the FWS with the opportunity to participate in the formulation and evaluation of project plans and to present reports to the BR, including recommendations relating to fish and wildlife aspects of the project plan. The Corps issued procedures dated 15 August 1973 (to be updated in 1978) which require each District Engineer to provide the Federal and state fish and game agencies with advance information on the studies underway in his planning program; notify them of the initiation of the project investigation; continue liaison, including conferences, throughout the investigation; and obtain the recommendations of the fish and wildlife agencies. The SCS has the least stringent requirements for fish and wildlife agency input. Still, their procedures do encourage the Federal and state fish and game agencies to participate actively in project formulation and to incorporate needed measures in each project to the maximum extent feasible.

Once the Federal and State fish and game agencies have been notified of a project plan and brought into the planning process, they must initiate an investigation to develop timely recommendations. Although conducting investigations and formulating instream flow recommendations are usually time-consuming and expensive tasks, an insistence on timely performance could result in additional costs because of the lack of flexibility available to the field office administrator in allocating time of personnel. Also, earlier efforts can be wasted because preliminary construction plans are often changed or abandoned later on.

In Oregon, negotiation with the Federal construction agency for storage space in a reservoir must be combined with an application to the State for the right to use the water to be stored. Ordinarily, under Oregon's form of the appropriation doctrine, adopted by legislative fiat in 1909, no water rights can be issued for instream use, since by definition, appropriation requires a diversion. Special legislation adopted in 1955 provides a method for the Water Policy Review Board to set and enforce minimum instream flows for the legislatively recognized beneficial use of fish and wildlife maintenance. However, these flows are not looked upon as water rights _per se_, though they are as far as enforcement is concerned on a par with water rights achieved by diversionary appropriation. Although where stored water is concerned, the dam spillway is sufficient diversion of the water to qualify it as an appropriation of water. Hence, the Water Resources Department may legally issue a water rights permit for an instream use in such a situation.

An Oregon application of this strategy then, requires the FWS or the State Department of Water Resources to make early application to the State permit authority for the right to appropriate the amount of water to be stored in the storage space acquired as a result of negotiation with the Federal construction agency. The earlier the application, the earlier the permit; late application might result in a lower priority than other appropriators and loss of the water to them in case of a water shortage.

III. Illustration

The CE's Lost Creek Project was closed February 18, 1977, and began operation during the year. Lost Creek Lake is one of the three multiple-purpose storage projects authorized by Congress in 1962 to provide for flood control and water resource development in the Rogue River Basin. The Lost Creek project is located on the Rogue River 154 miles upstream from its mouth and about 27 miles northeast of Medford. The project will be operated for the authorized purposes of flood control, irrigation, municipal, and industrial water supply, fish and wildlife enhancement, hydroelectric power generation, water quality control, and recreation.

The project consists of a 330-foot-high rockfill dam; a gate-controlled concrete chute spillway located in the left abutment; and a regulating outlet tunnel, power penstock, and intake tower with multi-level intakes located in the right abutment. The powerhouse will provide 49,000 kilowatts of power. The reservoir will provide 315,000 acre-feet of usable storage for flood control and water conservation. Fishery-enhancement provisions include Cole M. Rivers Fish Hatchery, built to compensate for lost spawning and rearing areas and to stock the reservoir. Also, stored water is released at proper temperature, to enhance downstream fishery habitat on the Rogue River.

The Rogue fishery contains several important species. Coldwater species include salmonids, winter and summer steelhead, spring chinook, fall chinook, coho salmon, and resident trout. Various warmwater species live further upstream, in a wetland habitat resulting from sediment fill behind an old power company dam now part of a park operated by Jackson County. This wetlands habitat also supports a large heron rookery. Despite disadvantages for the coldwater fishery, the Oregon Department of Fish and Wildlife supports retaining this dam in the system because of the advantages for wildlife rights for flows and storage. The flow regimens applied for were developed by these State agencies and the FWS and then presented to Congress. The amount of storage originally filed on for Lost Creek Reservoir was 125,000 acre-feet, the average annual amount shown by then-current studies. This amount was to be required to be released to supplement natural flows. This amount probably would have been enough to give the assurances Congress required; however, in 1965, while the project was still in the early planning stages, members of the Game Commission staff were able to convince the Corps that a higher degree of protection for the fish enhancement function of the project was desirable and that such storage could also help protect the other authorized project functions of irrigation, water supply, and water quality control. Hence, the Corps requested that the Water Resources Board modify its minimum stream flow program for the Rogue to protect a higher level of natural flows. The Board had set minimum flows of 1000 cfs at the Raygold and Savage Rapid Dams and 735 cfs at the Rivers' mouth in 1959. In 1966 these were raised to 1200 cfs at the dams and 935 cfs at the mouth. At the same time, the State Game and Fish Commissions filed with the State Engineer for an additional 100,000 acre-feet of storage in Lost Creek Reservoir. The increased storage amount was based on a study which showed amounts of stored water which would have been needed for each year of a 31-year period similar to the period 1929 to 1959. The results of that study showed that in 4 of the 31 years amounts in excess of 200,000 acre-feet would have been required. The amount of 225,000 acre-feet was arrived at in order to plan for the possibility of a year with even more severe conditions.

Out of a total of 465,000 acre-feet, the fish and wildlife allocation is 225,000 acre-feet to 125,000 acre-feet from annual storage and 100,000 acre-feet from carryover storage. At first glance this appears to be a fish and wildlife coup. In practice, however, this allocation may be reduced. The Corps of Engineers originally planned to build the Lost Creek Project together with the Elk Creek Project. Because of differences in water quality, water for downstream flow improvement was to come from Lost Creek Reservoir, while water for irrigation, industrial, and municipal use was to come from Elk Creek Reservoir. However, the Elk Creek Project has been shelved at the request of the State of Oregon. Thus if a water shortage should occur, demands for irrigation, industrial, and municipal uses might have to be filled from Lost Creek Reservoir. In such an event the storage will be divided pro rata, in the same proportions as total storage. It is thus possible that the 225,000 acre-feet might be reduced to 195,000 acre-feet during short water years.

Construction on the project began in 1967; the main dam was begun in 1972. In 1973 the Fish Hatchery portion of the project was completed. The dam was completed in 1976 and closed early in 1977. Seasonally varying releases of from 700 cfs to 2000 cfs are to be made annually from the 225,000 acre feet of storage allocated to the fishery. Forest Service sources indicate that during the 1977 summer season flows of up to 900 cfs were released--150 cfs more than was coming into the dam.

The decision process on the Lost Creek Project spanned more than a decade and involved a number of State agencies in negotiation with each other as well as with the CE. Prior to congressional approval of the project in 1962, extensive negotiations involving the Corps, the Fish and Game Commissions, and the Oregon Water Resources Board had taken place. Later negotiations resulted in increasing the amount of storage allocated fisheries and hence the amount of fishery benefits. Recommendations of storage allocations and releases were carefully dovetailed with applications for water permits.

The Department of Fish and Wildlife conducted studies used to support the Lost Creek Reservoir fish and wildlife allocation over a ten year period. The Department estimates that it devoted one-person year to obtaining this allocation.

IV. Evaluation

As illustrated by the Lost Creek Project, this strategy has apparently displayed significant past utility. Instream flow recommendations made by the State fish and game agencies prior to project construction not only were accepted by the construction agency, but also were supported by it in subsequent applications for State water permits. Because the State resource agencies were involved in the early planning stages, they were able to propose increased flows at a stage when the construction agency was amenable to increasing fishery benefits. Furthermore, an Enviro Control study of 28 flow recommendations in Oregon revealed that 73% of the recommendations made prior to construction were accepted without modification as compared to only 47% of those made during or after construction.

In judging the future effectiveness of the strategy, a number of factors must be considered. The strategy is applicable only when a Federal construction agency is building or modifying a project. Such construction will probably decrease in the future when compared to the spate of construction in 20 years after World War II. Users of this strategy are limited to the FWS and the Oregon Department of Fish and Wildlife although private individuals or public interest groups can exert some influence with the construction agencies on behalf of the recommendations by conservation agencies.

The effectiveness of this strategy depends, in large part, on the construction agencies' close adherence to their own adopted procedures concerning early notification of fish and wildlife agencies on project planning matters. According to FWS and Oregon Department of Fish and Wildlife personnel, construction agencies have been following these procedures in Oregon, especially in recent years. Even if the Federal and state fish and game agencies are informed of a project being planned and their inputs are invited, however, they must decide which projects to investigate in depth where a considerable expenditure of limited personnel and funds would be warranted. Also, timely investigations and recommendations may deprive State and Federal fish and game agencies of some flexibility in budgeting and scheduling. Finally, although a timely flow recommendation enjoys a better chance of acceptance, there is no assurance that such a recommendation will not be rejected on some other basis such as the reasonableness of the flow amounts requested.

Despite these constraints, this strategy does have some definite advantages. Offering flow recommendations is already part of an institutionalized process which has been ongoing for 30 years between the fish and wildlife agencies and the Federal construction agencies. This process has a firm legal basis and should be improved in the future.

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STATE-FEDERAL FLOW REQUESTS MADE SPECIFIC

I. Identification

Specifying instream flow requirements for a particular stream reach or tributary below a dam and reservoir, and monitoring actual instream flows there to ensure that downstream resource values are protected, involves detailed on-site investigations by the fish and game agency and subsequent stream gaging. Studies such as transect surveys must be performed at downstream locations selected so as to determine the instream flow needs in specific stream reaches below the dam site. Recommendations would then be offered to the construction agency specifying needed flow releases which, if accepted, would be incorporated into the reservoir's operating criteria. Gaging stations, located within the specific downstream reaches, would determine the sufficiency of the actual releases. The legal or administrative basis of this strategy is the interagency consultation process as provided for by the Fish and Wildlife Coordination Act.

II. Application

This strategy would be applied when the fishery, rookery, or other biotic resource within a reach or tributary remotely downstream from a dam and reservoir project is predicted to be, or is already, adversely affected by project flows. Often, a downstream fishery is threatened by low flows even though a required minimum flow is discharged upstream at the dam. Stream diversions and seepage from the stream channel often are responsible for the diminution of the original flow. Also, fishery flows required directly below the dam may be insufficient within a more remote reach or tributary downstream to satisfy localized fish and wildlife habitat requirements. In both cases, the specification of an instream flow requirement at a particular downstream site in addition to, or in place of a project flow release, and the installation of a streamflow gage will facilitate suitable flows in the remote stream reach or tributary. Furthermore, exact requirements supported by careful field investigations will be more persuasive in seeking any flow reservation.

Advocates of this strategy would be the Oregon Department of Fish and Wildlife and the FWS. Public interest groups aware of localized fish and wildlife needs and stream conditions could also participate in applying this strategy. Implementation of the strategy requires that instream flow recommendations be provided to the construction or permit agency during the appropriate planning stage (see strategy entitled State-Federal Flow Requests Made Early). For existing projects, reauthorization or relicensing proceedings or administrative reassignment of reservoir storage could be instituted to reserve needed flows and provide gaging stations (see strategies entitled State-Federal Combined Storage and Flow Requests, Federal License and Permit Stipulations, and Federal Reauthorization of Projects).

The principal costs of applying this strategy result from detailed instream flow field studies performed by the involved fish and wildlife agencies at downstream sites. Installation and maintenance of streamflow gages in the designated stream reaches will account for additional costs.

III. Illustration

Under Oregon Rev. Stat. 536. 310 (7) the Oregon Water Policy Review Board is directed to consider: "The maintenance of minimum perennial streamflows sufficient to support aquatic life. . .". In 1968 the Oregon State Game Commission, now the Department of Fish and Wildlife, investigated stream flow requirements in the Umpqua Basin in order to supply the Board with recommendations for revising the minimum flow designations set in 1958 for that basin. These recommendations were published by the Department in their report on the Umpqua Basin published in 1972, and the recommendations were considered, and some of them adopted, by the Board in 1974.

The Game Commission recommended both minimum and optimum flows for the following reasons: although Umpqua Basin streams have high annual water yields, low flows in summer critically restrict natural fish production. A reasonable level of fish production can be supported by minimum flows; however, production under minimum flow regimes falls far short of that which the stream courses are potentially capable of supporting. Recommended stream flows were principally designed to accommodate the environmental requirements of salmon and steelhead, since these are acknowledged to be Oregon's most valuable fisheries. Though summer flow requirements of anadromous and resident salmonids are similar, the anadromous fish have higher flow requirements during the migration and spawning seasons.

Measurements of late spring and early fall stream flows provided the information to formulate flow recommendations for fish migration, spawning, and egg incubation. Data obtained during the summer low-flow period were used to help develop rearing flow recommendations.

Spawning flow recommendations were developed from data obtained at cross-sections located on gravel bars representative of those used by spawning fish. Measurements of stream width, with flow meeting minimum depth and minimum and maximum velocity requirements of fish, were taken at various flows. Standard depth and velocity criteria were applied to assure recommendations commensurate with biological requirements. The resulting relationships were then graphed and recommended flows determined. Optimum spawning flows yielded the greatest amount of gravel usable for spawning, while minimum spawning flows approximated maximum efficient use of the water for fish. Flows recommended for passage of adult fish migrating to spawning beds were the minimum flows necessary for physical movement.

Flows recommended for the rearing period were designed to provide suitable food, shelter, and water quality conditions. Recommended minimum flows for two of the more than 140 checkpoints designated by the Oregon State Game Commission 1968 Study are as follows:

Months	Umpqua River USGS Gage #14-3229	Smith River USGS Gage #14-3231
Jan-Apr	1,000	180
May	1,000	150
June	1,000	100
July	750	50

Aug	750	50
Sept	750	50/150
Oct	1,000	200
Nov	1,000	200
Dec	1,000	180

To benefit aquatic life, the flows should arrive at the specified location and continue to the mouth of the stream or to the next point for which a different flow is recommended. Recommended minimum flows are designed to provide instream conditions capable of maintaining a minimum desirable level of natural production.

The initial costs of such a comprehensive study are, of course, substantial. However, since the study can be applied to many different proposals, projects, or permits, once the study is complete, costs are minimal.

IV. Evaluation

In many states, a major constraint on past use of this strategy has been the inadequacy of instream flow field studies. In Oregon, however, as is well illustrated by the Oregon State Game Commission Study of the Umpqua Basin, time and resources were devoted to producing a thorough study. The resources devoted to the study were justified in the light of the decision of the Water Resources Board, now the Water Policy Review Board, to increase the minimum streamflow designations for that river system. Historically, flow recommendations were made for the entire reach below the project to a downstream confluence with an identifiable tributary or a main stem river without investigating the requirements of intermediate stream segments. Little attention was paid to the effects of irrigation diversions or return flows. Likewise, consideration of tributary inflows and groundwater recharge was overlooked in the evaluation of flow needs.

However, these variables are receiving greater attention in contemporary flow studies, as is illustrated by the Umpqua study. The study designates more than 140 checkpoints for flows, including many on intermediate stream segments and smaller tributary streams. Though the Board did not adopt all of these checkpoints it did adopt a substantial number of them. Although the costs associated with such detailed investigations are significant, they are justifiable where high-value fish and wildlife resources are at stake.

An added constraint in the future will be the costs of the installation and maintenance of stream flow gages which are necessary to fully implement this strategy. Conversations with the United States Geological Survey indicate that an assumption of gaging costs by a construction agency is determined on a case-by-case basis. In some instances, the construction agency and the fish and game agency will share these costs; otherwise, either one or the other will assume the total costs. The cost of installing a gage can range from $15,000 to $40,000; approximate annual operation and maintenance costs are $4,000.

The future effectiveness of this strategy will be enhanced by improved flow study methodologies. The ability to document seasonal instream flow needs for a specific stream reach lends authenticity and credibility to the fish and wildlife agency's bargaining position, thus increasing the likelihood of a flow reservation. On occasion, the ability to quantify the instream contributions of tributary inflows and irrigation return flows could result in a downward adjustment of project releases, thereby preserving water for other beneficial uses.

Sources in the Oregon Department of Fish and Wildlife believe that the future effectiveness of this strategy also depends on the cooperation of the construction agencies and of the Oregon Water Policy Review Board. The Umpqua Basin Study illustrates past success of this strategy on the State level. Whether the new Board will follow the precedent set by its predecessor, the Water Resources Board, remains to be seen. Because the FWS and Federal construction agencies appear to be coordinating more effectively in recent years, the future utilization of this strategy on the Federal level may increase.

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STATE-FEDERAL COMBINED STORAGE AND FLOW REQUESTS

I. Identification

When recommending flow releases from proposed or existing reservoir projects, the Fish and Wildlife Service and the Oregon Department of Fish and Wildlife should base their recommendations in part on information about storage capacity and projected sales of stored water. The strategy thus embrances simultaneous negotiations for downstream flows and surplus storage capacity in the reservoir sufficient to guarantee the flows. The legal basis of this strategy is the Fish and Wildlife Coordination Act which provides for consultation between state and Federal fish and game interests and the Federal construction agencies.

II. Application

This strategy is applicable in two situations: when a project is being planned by a Federal construction agency and when storage space becomes available in either a planned or existing reservoir. The parties to be involved in this strategy are primarily the FWS and the Oregon Department of Fish and Wildlife. They would apply this strategy in their dealings with Federal construction and operating agencies over planned and existing reservoir projects. Support for this strategy can be generated from local residents, conservancy districts, sportsmen, and environmental organizations.

Most operating reservoirs in the west contain either unobligated, unutilized or underutilized storage. "Unobligated storage" is reservoir storage which is not contractually obligated to water users although it is bound by legislative intent for particular purposes. "Unutilized storage" is contractually obligated for future or deferred use, whereas "underutilized storage" is currently not in use for a particular purpose although contractually obligated for that purpose. Knowledge of unutilized, unobligated, and underutilized storage can lead to it interim or permanent allocation for minimum flow releases to satisfy instream flow needs of fish and wildlife. Even without producing an outright allocation, such knowledge can certainly strengthen the bargaining position of fish and wildlife interests seeking instream flow reservations.

Early in the project planning phase, the construction agencies should be requested to provide the FWS and state fish and game agencies with information regarding reservoir storage capacity and the projected sale or other commitment of storage. With this data, the fish and game agencies should be able to determine and negotiate for the amount of storage available to ensure minimum instream flows below the reservoir.

During project operation, some storage may become available -- i.e., unobligated, unutilized or underutilized. The FWS and the state fish and game agencies should have cultivated a cooperative arrangement with the Federal construction agencies, requiring notification when reservoir storage space becomes available. With this information, fish and game agencies may decide to recommend the allocation of reservoir storage to reinforce instream flow recommendations if the downstream fishery warrants this extra measure of protection.

In Oregon negotiation with the Federal construction agency for storage space in a reservoir must be combined with an application to the state for the right to use stored water. Ordinarily under Oregon's appropriation doctrine, no water rights can be issued for instream use, since by definition, appropriation requires diversion. Special legislation adopted in 1955 provides a method for the Water Policy Review Board to set and enforce minimum instream flows for the legislatively recognized beneficial use of fish and wildlife maintenance, but these flow settings are not looked upon as water rights per se, though they are, so far as enforcement is concerned on a par with water rights achieved by diversionary appropriation. However, where stored water is concerned, the dam spillway is sufficient diversion of the water to qualify it as an appropriation of water. Hence the Water Resources Department may legally issue a water rights permit for an instream use in such a situation. In Oregon, application of this strategy requires the FWS or the State Department of Water Resources to make application to the state permit authority for the right to appropriate the amount of water to be stored in the storage space required as a result of negotiation with the Federal Construction Agency.

The costs involved in implementing this strategy could vary dramatically, depending on the level of cooperation between the fish and game agencies and the Federal construction and operating agencies. If cooperative agreements under the Fish and Wildlife Coordination Act are successfully implemented (see strategy entitled State-Federal Interagency consultation) then this strategy would not involve substantial costs. If, however, the FWS and the State fish and game agencies are not routinely furnished with information on planned reservoir capacities and anticipated sale of water storage, or information on available storage in existing reservoirs, then significant costs can be incurred in gathering this information.

III. Illustration

The Lost Creek Lake Project, located on an upper reach of the Rogue River in Southwestern Oregon, is one of three multiple-purpose storage projects authorized by Congress in 1962 to provide for flood control and water resource development in the Rogue River Basin. The project is located on the Rogue River 154 miles upstream from its mouth and about 27 miles northeast of Medord, Oregon. The project's authorized primary purposes are flood control, irrigation, municipal and industrial water supply, fish and wildlife enhancement, hydroelectric power generation, water quality control, and recreation. Construction of the project began in 1967; the main dam was begun in 1972. In 1973 the Fish Hatchery portion of the project was completed, the dam was completed in 1976 and closed early in 1977.

The project consists of a 330-foot high rockfill dam; a gate-controlled concrete chute spillway located in the left abutment; and a regulating outlet tunnel, power penstock, and intake tower with multi-leveled intakes located in the right abutment. The powerhouse will provide 49,000 kilowatts of power. The reservoir will provide 315,000 acre-feet of usable storage for flood control and water conservation. Fishery-enhancement provisions include Cole M. Rivers Fish Hatchery, built to compensate for lost spawning and rearing areas, and to stock the reservoir. Also, stored water is released, at proper temperature, to enhance downstream fishery habitat on the Rogue River. Downstream fishery enhancement and habitat improvement has been a major part of the project from its inception.

The Rogue fishery contains several important species. Coldwater species include salmonids, winter and summer steelhead, spring chinook, fall chinook, coho salmon, and resident trout. Various warmwater species live further upstream, in a wetland habitat resulting from sediment fill behind an old power company dam now part of a park operated by Jackson County. This wetlands habitat also supports a large heron rookery. Despite disadvantages for the coldwater fishery, the Oregon Department of Fish and Wildlife supports retaining this dam in the system because of the advantages for wildlife. The main reason for instream flows for fish and wildlife on the Rogue is to maintain cool water temperatures in the summer for the salmonids.

As a condition to construction and operation of the project, Congress specified in Public Law 87-874 that the CE and the State of Oregon give assurance that flows to enhance fish resources would be maintained in the stream. In order to comply with this condition the then Oregon Game Commission, together with the Fish Commission, applied to the Oregon State Engineer for rights for flows and storage. The flow regimens applied for were developed by these State agencies and the FWS and presented to Congress. The amount of storage originally filed on for Lost Creek Reservoir was 125,000 acre-feet, the average annual amount shown by then current studies. This amount was to be required to be released to supplement natural flows, primarily for the purpose of regulating water temperatures in the stream reach between the dam and the town of Marial.

This amount probably would have been enough to give the assurances Congress required; however, in 1965, while the project was still in the early planning stages, members of the Game Commission staff were able to convince the corps that a higher degree of protection for the fish enhancement function of the project was desirable and that such storage could also help protect the other authorized project functions of irrigation, water supply, and water quality ity control, Hence, the Corps requested that the Water Resources Board modify its minimum stream flow program for the Rogue to protect a higher level of natural flows. The Board had set minimum flows of 1000 cfs at the Raygold and Savage Rapid Dam and 735 cfs at the River's mouth in 1959. In 1966 these were raised to 1200 cfs at the dams and 935 cfs at the mouth. At the same time, the State Game and Fish Commissions filed with the State Engineer for an additional 100,000 acre-feet of storage in Lost Creek Reservoir. The increased storage amount was based on a study which showed amounts of stored water which would have been needed for each year of a 31-year period similar to the period 1929 to 1959. The results of that study showed that in four of the 31 years, amounts in excess of 200,000 acre feet would have been required. The amount of 225,000 acre-feet was arrived at in order to plan for the possibility of a year with even more severe conditions.

Out of a total of 465,000 acre-feet the fish and wildlife allocation is 225,000, 125,000 acre-feet from annual storage and 100,000 acre-feet from carryover storage. At first glance this appears to be a fish and wildlife coup. In practice, however, this allocation may be reduced. The Corps of Engineers originally planned to build the Lost Creek Project together with the Elk Creek Project. Because of differences in water quality, water for downstream flow improvement was to come from Lost Creek Reservoir, while water for irrigation, industrial, and municipal use was to come from Elk Creek Reservoir. However, the Elk Creek Project has been shelved at the request of the State of Oregon, thus if a water shortage should occur, demands for irrigation industrial, and municipal uses might have to be filled from Lost Creek Reservoir.

In such an event the storage will be divided pro rata, in the same proportions as total storage. It is thus possible that the 225,000 acre-feet might be reduced to 195,000 acre-feet during short water years. Seasonally varying releases from 700 cfs to 200 cfs are to be made annually from the 225,000 acre-feet of storage allocated to the fishery. Forest Service sources indicate that during the 1977 summer season flows of up to 900 cfs were released 150 cfs more than was coming into the dam.

The Department of Fish and Wildlife conducted studies used to support the Lost Creek Reservoir fish and wildlife allocation over a ten year period. The Department estimates that it devoted one-person year to obtaining this allocation.

IV. Evaluation

As illustrated by the example of the Lost Creek Reservoir, this strategy can be successful given the right combination of events. In the case of the Rogue, political pressure was on the side of Fish and Wildlife interests because of the extreme value of the salmon and steelhead fishery involved. Moreover, the CE needed additional economic support for its project, so that agency was open to negotiations for streamflow stipulations.

Also important was the coordination of Federal and State planning. The Oregon State Fish and Game Commissions not only dovetailed their requests to the CE for reservoir storage allocations with their recommendations for instream flow releases, but also paralleled these efforts with applications for State water permits from the State Engineer for the stored water and requests for increased minimum instream flow designations from the Water Resources Board. The Lost Creek Project is an illustration that combination. The storage provides the source for the instream flow releases and the permit assures a permanent priority status which is not subject to reversal by the Water Policy Review Board.

The result of these combined requests was the allocation of nearly two-thirds of the reservoir's storage to fish and wildlife enhancement, 100,000 acre-feet more than the resource agencies had originally requested. The success of this strategy at Lost Creek depended partly on the circumstance that the construction agency needed additional benefits to justify the project; however, the willingness of the resource agencies to devote time and resources to developing the necessary studies and obtaining the necessary State permits was also an important factor.

To a great extent, the future effectiveness of this strategy for new projects depends on successfully implementing other strategies, such as achieving interagency coordination under the Fish and Wildlife Coordiantion Act (see Strategy entitled State-Federal Interagency Consultation) and recommending instream flows early in the planning process (see strategy entitled State-Federal Flow Requests Made Early). It is essential that fish and game agencies actively participate in planning reservoir projects and are kept informed periodically about the availability of storage in already authorized and operating reservoirs.

As illustrated by Lost Creek, the strategy's greatest potential exists when the local sponsoring entity and/or the construction agency sees the benefits involved in releasing available storage for fishery purposes and brings fishery agencies into the process of planning reservoir releases. In such instances, the costs of implementing this strategy are not particularly great; however, without cooperation among the agencies involved, the costs could be substantial. For example, major cost might be incurred by the fish and wildlife agencies in gathering information which could have been provided by the construction and operating agencies. On the other hand fish and wildlife interests must justify the economics of allocating any available storage for fish and wildlife purposes.

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ENGINEERING ALTERNATIVES

COORDINATED MULTI-RESERVOIR OPERATIONS

I. Identification

The operations of a multi-reservoir system are regulated through an operations manual which specifies the flows to be released in keeping with the stated purposes of each project. The most common purposes for which multi-reservoir systems are operated are flood control, power production, and irrigation.

Coordinated operations of a multi-reservoir system to sustain or elevate minimum flows would require modification of the operations manual. To accomplish this, authorizing or licensing documents for component projects within the system must be modified to include the necessary releases. Modification of Federal projects may require reauthorization or relicensing proceedings (see Permit Stipulations). At the minimum, an adjustment of flow releases would entail the preparation of a memorandum of agreement between the operators of the system and the fish and wildlife interests. The legal and administrative basis for this strategy is the agency and interagency regulations and procedures governing those agencies operating reservoir systems. The Fish and Wildlife Coordination Act is the interagency mechanism.

II. Application

This strategy would be applied where a fishery or other aquatic resource below a dam within a multi-reservoir system could be rehabilitated or enhanced by coordinated releases from the system. Parties involved in the implementation of this strategy are likely to be the FWS, the Oregon Department of Fish and Wildlife, and the agency or agencies operating the system. In many instances, the system operator will be a single entity, such as the Bureau of Reclamation operating an irrigation project. Where two or more entities such as the Bureau and the Corps would be responsible for project operations, regulation of the system is often mediated using a memorandum of agreement among the agencies involved. Attempts to secure minimum instream flows by balancing system operations would call for drafting a revised memorandum of agreement. In larger systems, where private or municipal power companies may be among the operating agencies, coordination may be even more complex and difficult to achieve.

For those river systems in Oregon which form a part of the Columbia Basin, application of this strategy may involve the Reservoir Control Center operated by the Corps of Engineers North Pacific Division Office in Portland. A request from an agency or an individual, to the Center for an action to mitigate fish and wildlife damage at a given project will be considered. After the need has been verified by a Project Engineer and if the need does not jeopardize the project's authorized purposes, the Corps will comply with the request.

Upon determining stream flows to be insufficient to sustain the fishery below a dam within the reservoir system, the interested fish and wildlife agency must examine the operating characteristics of the system, especially its flow regimes and its storage capacities (see strategy entitled State-Federal Combined Storage and Flow Requests). Field studies would be performed to establish the flow needs for the affected stream reach. Given the system characteristics and the instream flow needs, the fish and wildlife interests could propose to alter the operations manual and memorandum of agreement to ensure the recommended flows.

The cost of conducting system-wide flow studies will be the principal cost incurred during the implementation of the strategy. Additional costs will result from presenting a convincing case to the operating agency toward revising the system operations manual and in reauthorization or relicensing proceedings if these become necessary. The process may prove to be a long one; because of the many agencies involved in dam operations in some of the larger basins, bargaining for fisheries may have to be done dam by dam.

III. Illustration

The series of twelve dams on the Willamette River and its tributaries operated by the U.S. Corps of Engineers illustrates the utility of this strategy. Most of the dams were authorized in the 1940's; they were built between 1950 and 1966. The authorized purposes of the system are flood control, navigation, irrigation, hydroelectric power, water quality control, fish and wildlife enhancement, and municipal and industrial water supplies. The Corps operates them for these purposes. The Oregon Department of Fish and Wildlife has worked successfully with the Corps of Engineers to improve local fish and wildlife conditions associated with the dams.

Since 1968 coordination of reservoir operations on Willamette and other streams in the Columbia River Basin has been accomplished with the help of the Reservoir Control Center established at the North Pacific Division office of the Corps in Portland. This center plans and directs the regulation of reservoirs in the Columbia Basin for the authorized purposes of the projects. The Control Center's objective is to maintain balance among the multiple purposes of the various dams including such things as increasing instream flows when necessary for downstream migration of juvenile salmonids, and holding reservoir pools at optimum levels for fish and wildlife. These actions are seen as part of the authorized purposes of these projects since these projects included from their inception facilities such as fish ladders for mitigating damage to fish and wildlife caused by the project.

Personnel of the Oregon Department of Fish and Wildlife work closely with the Corps of Engineers Reservoir Control Center and the District Office to achieve desirable conditions for fish and wildlife. Oregon Department of Fish and Wildlife field officers monitor stream flow conditions; wherever they discover specific areas where fish life is threatened by adverse conditions which could be mitigated by increasing the flow, the Corps is consulted. A staff member works with the Corps, coordinating these requests, on a day-to-day basis. Agreements between the Oregon Department of Fish and Wildlife and the Corps may be either informal or formal. The level of agreement is dependent on the severity, duration, and nature of the problem. Examples of such agreements successfully implemented in the past are:

- An ongoing arrangement to hold the flow from the Fall Creek reservoir through the summer so that there will be cold water for Fall Chinook spawning. An early drawdown results in water temperatures of 60° F, which will kill the eggs in the gravel.

- Continuing regulation of Hills Creek, Dexter, and Lookout Point dams to keep water temperatures cool enough for September spawning in the holding pond for spring Chinook.

Examples of arrangements for specific flows to improve specific conditions are:

- In the summer of 1976, the Corps agreed to a flow of 700 cfs on the Middle Fork of the South Santiam, which has a usual flow of 400 cfs during that season. The Corps was able to comply with the agreement during all but a few days, when the flow dropped to 600 cfs.
- In 1976, the Oregon Department of Fish and Wildlife was able to get a hold on Fall Creek so that colder water temperatures would be present during the Fall Chinook spawning period.
- In 1976 the Oregon Department of Fish and Wildlife recommended release of a large quantity of water from Hells Creek to Lookout Point to cool the water in Lookout Point Reservoir and the holding pond at Dexter. The Corps complied with this recommendation.

In accomplishing these and similar arrangements, Department of Fish and Wildlife expended some staff time to conduct field studies and to formulate recommendations to the Corps. In addition, staff time was devoted to consulting with the Corps. However, the cost of applying this strategy in the Willamette Basin has been minimal since no special studies were required.

IV. Evaluation

As the Willamette illustration shows, this strategy has been successfully applied in Oregon in the past. Because the CE is the primary operating agency in the Willamette Basin system and operates the Reservoir Control Center the strategy has been fairly easy to apply there, and the costs were minimal.

A major constraint on the applicability of this strategy is how much water is available for allocation to the various uses. The Corps must decide what is necessary for its authorized uses, and these needs vary from time to time. For example, in mid-August the flows in the Columbia, where the larger power dams are located, began dropping. Thus more water from other areas in the Willamette is needed to make up the deficit and to keep up power production.

In the case of larger basins, where many operating and managing agencies are involved, such as the Columbia Basin System, Coordination becomes extremely complex, both because of the magnitude of the system and because of the number of parties and conflicting interests involved. Nevertheless, successful coordination is possible if the need is great enough. A cooperative attitude on the part of one significant operating agency, such as that of the North Pacific Division of the Corps of Engineers, the existence of a center for coordination, such as its Reservoir Control Center goes a long way toward achieving cooperation from other operating agencies. Also essential in achieving system-wide cooperation in a complex basin such as the Columbia is a sense of public recognition of the value of the threatened resource. In the 1977 low-flow crisis on the Columbia, for example, public pressure, including the support of the governors of the four Columbia Basin states, Oregon, Washington, Idaho, and Montana, was influential in getting both the Corps and the power company to schedule releases at each dam in the system for the downstream migration of fingerling salmonids.

Future utilization of this strategy will increase as the interest in fish and wildlife habitats increases compared with project purposes such as flood control, irrigation, and power production. Oregon Department of Fish and Wildlife officials are optimistic about the future effectiveness of this strategy because of the cooperative attitude of the Federal construction agency personnel. However, there are a number of cost constraints which will continue to limit the use of this strategy. The fish and game agencies will incur increasing costs for flow studies which increase in complexity and sophistication as entire multi-reservoir systems are analyzed in greater depth. Hydrologic data requirements and required engineering expertise will demand that fish and wildlife interests acquire the analytical skills of the construction agencies in addition to their established biological expertise. These constraints, though, do not preclude the use of this strategy, especially in view of the receptivity of the agencies such as the Corps to fish and wildlife needs.

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RESERVOIR SEDIMENT STORAGE RELEASES

I. Identification

Releases of yield from sediment reserve storage for augmenting instream flows involve storage space reassignment by the construction or administering agency. Sediment reserve storage space is the portion of reservoir capacity assigned to sedimentation during the economic life of the project. After a project is constructed, the total amount of storage capacity assigned to a sediment reserve will not be needed for many years. This storage, then, can be made available on a long-term interim basis for fish and wildlife protection and other beneficial uses. Such a reassignment is an administrative decision and does not necessitate Congressional reauthorization of the project. The legal and administrative basis of this strategy is the construction or operating agency's statutory authority and administrative regulations authorizing discretionary modifications of operating projects.

II. Application

This strategy will be discussed only as it applies to existing reservoirs. Applying it to proposed projects involves interagency coordination in the planning process (see strategies entitled State-Federal Flow Requests Made Early, State-Federal Combined Storage and Flow Requests, and State-Federal Interagency Consultations). The strategy may be formulated when a proposed or existing reservoir contains unused sediment reserve storage in the active reservoir space lying above the elevation of the lowest dam outlet. Such storage is normally preserved or else drawn down for beneficial uses such as recreation, irrigation or water supply in compliance with operating restrictions. Either the Oregon Department of Fish and Wildlife, Fish and Wildlife Service, or a conservation group could instigate this strategy if it determines that an available yield from the sediment reserve can rehabilitate or improve the fish and wildlife resources downstream from the existing reservoir. Ultimately, the concerned party must convince the construction or administering agency, such as the Bureau of Reclamation or the Corps of Engineers, to reassign a portion of the unused sediment reserve storage space to fish and wildlife purposes.

Implementation of this strategy involves two basic decision points. After reaching a favorable preliminary determination, the concerned party must decide to solicit the construction or administering agency for action to modify project operation and release some yield from the sediment reserve. Then the agency must decide if the desired modification is feasible and agreeable. Because of the controversy that is often associated with preserving instream flows, the construction or administering agency might seek formal Congressional approval.

The costs of this strategy to fish and wildlife interests are dependent on the detail and availability of information concerning the sediment reserve storage and the fish and wildlife resources downstream from the reservoir. The concerned party will need to know the amount, depletion rate, and current interim uses of the sediment reserve. In addition, the probable effects that increased instream flows, due to a certain yield of the reserve, would have on the fish and wildlife resources would have to be ascertained.

III. Illustration

This strategy has not been implemented in Oregon, so an example will be drawn from another state. Although no actual illustration could be identified, an example of a reservoir presently suitable to this strategy can be discussed. Completed in 1963, the Bureau of Reclamation's Paonia Project is located on Muddy Creek in west-central Colorado. The stream below Paonia dam supports trout habitat which would improve significantly if added reservoir releases of relatively clear water could be made.

Because of a projected severe sedimentation problem, a substantial portion (44%) of the active storage capacity of Paonia Reservoir was reserved for sediment accumulation. By the end of 50 and 100 years of reservoir operation, the deposition of sediment is estimated to reduce the active reservoir capacity from 18,150 acre-feet to 14,650 and 10,150 acre-feet, respectively. The Upper Colorado Regional Office of the Bureau has stated verbally that the 8,000 acre-feet of sediment reserve storage might be available for interim use.

In fact, the Bureau, in a project planning report, stated that surplus sediment reserve storage space in Paonia Reservoir would be available for flood control and incidental releases to maintain fish life in the stream below the dam. However, it was also stated that the North Fork Conservancy District could use the 8,000 acre-feet of reserved capacity for irrigation or other beneficial uses until it is required by the United States for one or more of the specified purposes. The BR's Upper Colorado Office confirmed that the conservancy district is utilizing this storage.

Neither the FWS nor Colorado Division of Wildlife has attempted to secure increased releases from Paonia Reservoir. However, the proposed Grand Mesa Project, which would require the construction of Electric Mountain Reservoir immediately upstream from Paonia Reservoir, will probably enable both organizations to review the Paonia storage situation. Furthermore, Electric Mountain Reservoir should diminish the sediment deposited in Paonia Reservoir, thus freeing some storage capacity for long-term obligation.

IV. Evaluation

Although this strategy apparently has not been implemented in the past, it does appear to have broad application because most reservoirs, especially the newer ones, contain substantial sediment reserve storage capacity in the active storage space. The strategy's future effectiveness is primarily limited by the ability of Federal, state or private fishery interests to:

- Determine that the available interim yield from sediment reserve storage can significantly improve the associated fish and wildlife resources

- Convince the construction or administering agency to reassign and release the surplus water storage for fish and wildlife benefits.

The Corps and Bureau frequently apply the surplus sediment reserve on an ad hoc basis to purposes such as irrigation and municiapl-industrial water supply. The user for these purposes is not charged for this water. Thus, it is likely that users of this supplemental water would lobby against its reassignment to fish and wildlife protection. Because of this factor and the reluctance of the construction or operating agency to reassign this storage, FWS and Oregon Department of Fish and Wildlife personnel are not particularly optimistic over the future effectiveness of this strategy. Probably the yield from sediment reserve storage space would be reassigned to fish and wildlife purposes only where it is currently unutilized and would significantly prove the downstream resources.

Attempting to ensure releases of sediment reserves requires an examination of existing project records and operations. Because FWS and State fish and game agencies' field offices direct their efforts towards proposed projects, implementing this strategy would involve an expenditure of personnel time normally not provided for from funds transferred by construction agencies. This is a major constraint upon the future effectiveness of this strategy. Probably the best opportunity to implement the strategy would arise when an existing project is modified or a planned project, such as the Grand Mesa Project, would have an impact upon existing reservoir operations.

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STREAM CHANNELS TO CONVEY STORED WATER

I. Identification

In operating dam and reservoir projects to convey stored water to downstream users, water is either released into the stream and diverted at a point downstream or conveyed directly from the reservoir via a canal or conduit. This strategy is an attempt to have proposed reservoir projects designed without direct conveyance systems at the reservoir so that water can be released into the stream to benefit fish and wildlife, then diverted as far downstream as may be feasible. This strategy can be effectuated through the consultative process stipulated by the Fish and Wildlife Coordination Act (FWCA).

II. Application

As provided by the Fish and Wildlife Coordination Act, the Fish and Wildlife Service and the Oregon Department of Fish and Wildlife conduct investigations of sites proposed for reservoir projects, then formulate and present recommendations to the construction agencies concerning fish and wildlife preservation or enhancement. If, as part of their investigations, the FWS and State agencies determine that a reservoir conveyance system may damage the downstream fishery or other biotic resources, they might recommend that such a system be modified. They could draw support from local interest groups and users of the resource to give greater force to such a recommendation.

In conducting their project investigations, the FWS and the Oregon Department of Fish and Wildlife are provided with information by the sponsoring agencies. Any information regarding proposed conveyance systems should be sought at the outset because a recommendation to modify or not build a conveyance system must be made early in the planning process. Because detailed engineering and planning are involved, construction agencies and permit applicants would resist a change of plans after spending time and money to develop them. Once the construction begins, a sponsoring agency almost assuredly would not stop construction solely on the recommendation of fish and wildlife interests.

III. Illustration

This strategy has not been implemented in Oregon; therefore, an illustration is used from Wyoming to demonstrate its utility. The proposed Middle Fork Reservoir on the Middle Fork Powder River serves as an illustration of this strategy's potential. In 1974, the Powder River Reservoir Corporation filed for a BLM right-of-way permit to flood certain Federally owned lands for the construction of Middle Fork Reservoir. The proposed reservoir will supply water for coal-related industrial development and, to a lesser extent, irrigation. As proposed, water would be conveyed from the reservoir through a canal system to meet these demands.

In 1976 at the request of the BLM, the FWS and Wyoming Game and Fish Department responded to the proposal. After joint field surveys were conducted, a report was submitted by the FWS to the BLM on March 5, 1976. The FWS recommended a minimum instantaneous release of 35 to 40 cfs during the non-irrigation season to develop a good-quality tailwater and downstream fishery. The recommended flow would approximate the historical average winter flow. Without these releases the existing fishery would be seriously curtailed.

The FWS recommended that the only practical way to realize a winter release of this magnitude without destroying the industrial water purpose of the proposed project would be to convey the industrial water down the existing Middle Fork channel to a downstream point of diversion 4.7 miles below the proposed dam. The FWS had indicated that the proposed modification would not result in additional construction.

In late 1977 the planned construction of Middle Fork Reservoir was delayed until the Department of the Interior's solicitor could determine if a right-of-way permit could be granted by the BLM, because the Powder River Reservoir Corporation had not adequately specified the use of the reservoir storage. If a permit was to be granted, the Secretary of the Interior might require that the permittee provide for storage releases sufficient to meet instream flow needs below the dam. It was expected that a decision would be made on the right of way permit sometime in February 1978.

IV. Evaluation

Although this strategy apparently has not as yet been applied in Oregon, it does offer potential for protection of fisheries directly downstream from reservoirs. Several severe constraints, though, must be weighed in judging future effectiveness. Reservoir conveyance systems usually occur as a function of project purpose or engineering necessity. Single-purpose power and municipal supply projects most frequently divert water directly from the reservoir. Most offstream appropriators seek gravity flow delivery by conduit or canal to minimize pumping costs; sound engineering judgement and ordinary cost saving considerations may demand direct conveyance from the reservoir. Since conveyance structures are costly, construction agencies and permit applicants normally would maximize the use of the stream channel, subject to trade-off cost factors such as high energy use to deliver water by pumping instead of gravity. As evidenced in the Middle Fork Reservoir case, the burden will be on the FWS and the State fish and game agency to justify their recommendation from a cost and engineering standpoint, taking the value of the threatened resource into account in a cost/benefit analysis.

Investigating a proposed project and formulating recommendations, pursuant to the FWCA, usually required substantial time and money. To implement this particular strategy may incur significant additional costs in performing detailed studies to defend a recommendation to modify the reservoir conveyance system. In the case of the Middle Fork Reservoir, the required engineering expertise and additional study cost was atypically low because the cost trade-offs were easily derived.

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